IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Johannes Jacobus MEERMAN et al.

Application No.: 10/500,713 Examiner: J. WOLLSCHLAGER

Filed: July 6, 2004 Docket No.: 119567

For: METHOD FOR MANUFACTURING FILAMENTS FROM AN OPTICALLY ANISOTROPIC SPINNING SOLUTION AND AIR GAP SPINNING DEVICE

BRIEF ON APPEAL

Appeal from Group 1791

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I. REAL PARTY IN INTEREST

The real party in interest for this appeal and the present application is Teijin Aramid B.V., by way of an Assignment recorded in the U.S. Patent and Trademark Office at Reel 020600, Frame 0784.

II. STATEMENT OF RELATED CASES

There are no prior or pending appeals, interferences or judicial proceedings, known to any inventor, attorney, or agent who prepared or prosecuted this application or any other person who was substantively involved in the preparation or prosecution of this application, that may be related to, or that will directly affect or be directly affected by or have a bearing upon, the Board's decision in the pending appeal.

III. JURISDICTIONAL STATEMENT

The Board has jurisdiction under 35 U.S.C. §134(a). The Examiner mailed a Final Rejection on December 29, 2008, setting a three-month shortened statutory period for response. The time for responding to the Final Rejection expired on March 29, 2009. Rule 134. A Notice of Appeal with a Pre-Appeal Brief Request for Review and a Petition for Extension of Time requesting a three-month extension of time under Rule 136(a) were filed on June 26, 2009. The time for filing an Appeal Brief expires the later of two months from the filing of the Notice of Appeal, or one month from the mailing date of the Notice of Panel Decision if a Pre-Appeal Brief Request for Review is sought. Bd.R. 41.37(c) and Official Gazette Notice, July 12, 2005.

Because a Pre-Appeal Brief Request for Review was filed and the Notice of Panel decision was mailed on July 20, 2009, the period for timely filing an Appeal Brief is August 26, 2009. This Appeal Brief is being timely filed with a Petition for Extension of Time requesting a two-month extension of time under Rule 136(a) on or before October 26, 2009.

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VI. STATUS OF AMENDMENTS

No Amendment After Final Rejection has been filed.

VII. GROUND OF REJECTION TO BE REVIEWED

The following grounds of rejection are presented for review:

1. Claims 1–7 are rejected as failing to comply with the written description requirement under 35 U.S.C. §112, first paragraph.

2. Amended Figure 2, filed April 30, 2007, is objected to as adding new matter to the disclosure under 35 U.S.C. §132(a) .[1]

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[1] MPEP §2163.06(II) provides, "A rejection of claims is reviewable by the Board of Patent Appeals and Interferences, whereas an objection and requirement to delete new matter is subject to supervisory review by petition under 37 CFR 1.181. If both the claims and specification contain new matter either directly or indirectly, and there has been both a rejection and objection by the examiner, the issue becomes appealable and should not be decided by petition."

VIII. STATEMENT OF FACTS

1. The "present invention" is related to the processes and devices taught by European Patent No. 0,904,431 ("Meerman"). Published Application ("APP"), ¶¶ [0003] and [0005].

2. Meerman generally relates to a process for manufacturing synthetic filaments where a spinning solution is forced through orifices, and then passed through an air gap and a coagulation bath in succession, and then through a discharge opening located at the bottom of the bath. Meerman, ¶¶ [0001] and [0002].

3. One of the problems concerning Meerman was the risk that coagulant from the coagulant bath will splash up and contact the spinneret plate, especially when a very small air gap is used. Meerman, ¶ [0016]; APP, ¶ [0006].

4. Meerman discloses the extent of the coagulant bath splashing is highly dependent on the geometry of the coagulation bath's bottom. Meerman, ¶ [0016]; APP, ¶ [0006].

5. Meerman discloses that in processes that use two or more spinning sections and a corresponding number of discharge openings in the bottom of the coagulation bath, coagulant splashing is reduced substantially by making the edges of adjacent discharge openings be on different levels. Meerman, ¶ [0016].

6. Appellants' specification discloses that in processes that use two or more spinning sections and a corresponding number of discharge openings in the bottom of the coagulation bath, coagulant splashing is reduced substantially by "introducing the geometry of the present invention." APP, ¶ [0006].

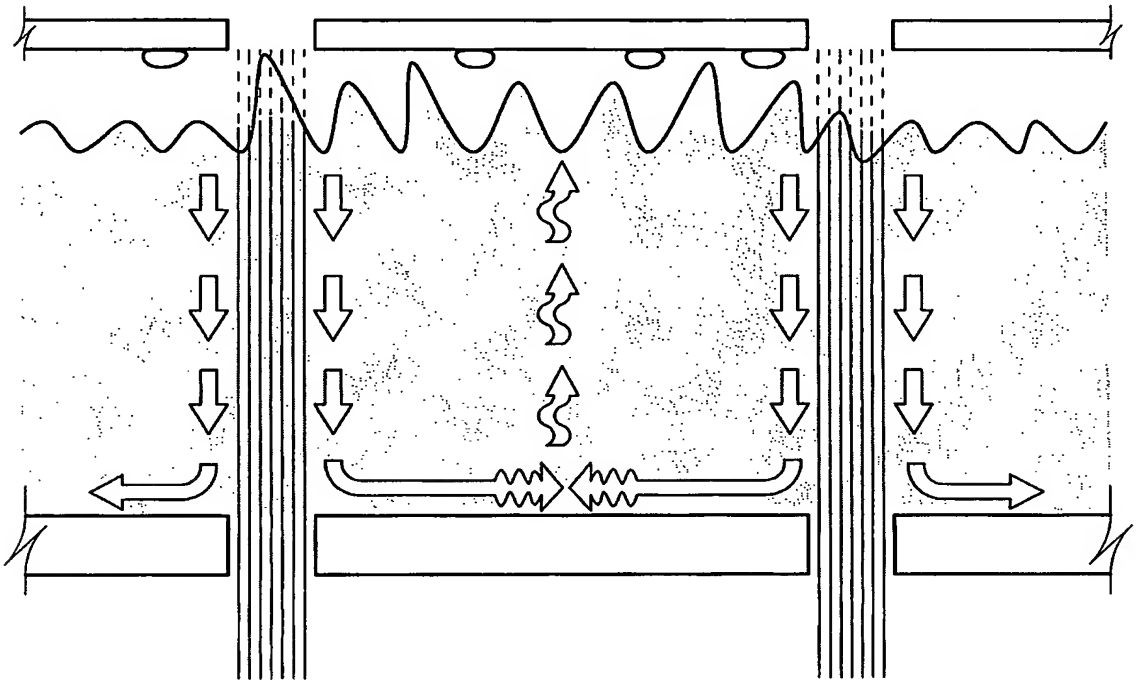
7. Meerman explains in paragraphs [0017] to [0018] how the edges of adjacent discharge openings being at different levels reduces coagulant splashing.

8. Paragraphs [0010] and [0011] of Appellants' specification are verbatim copies of paragraphs [0017] and [0018] of Meerman.

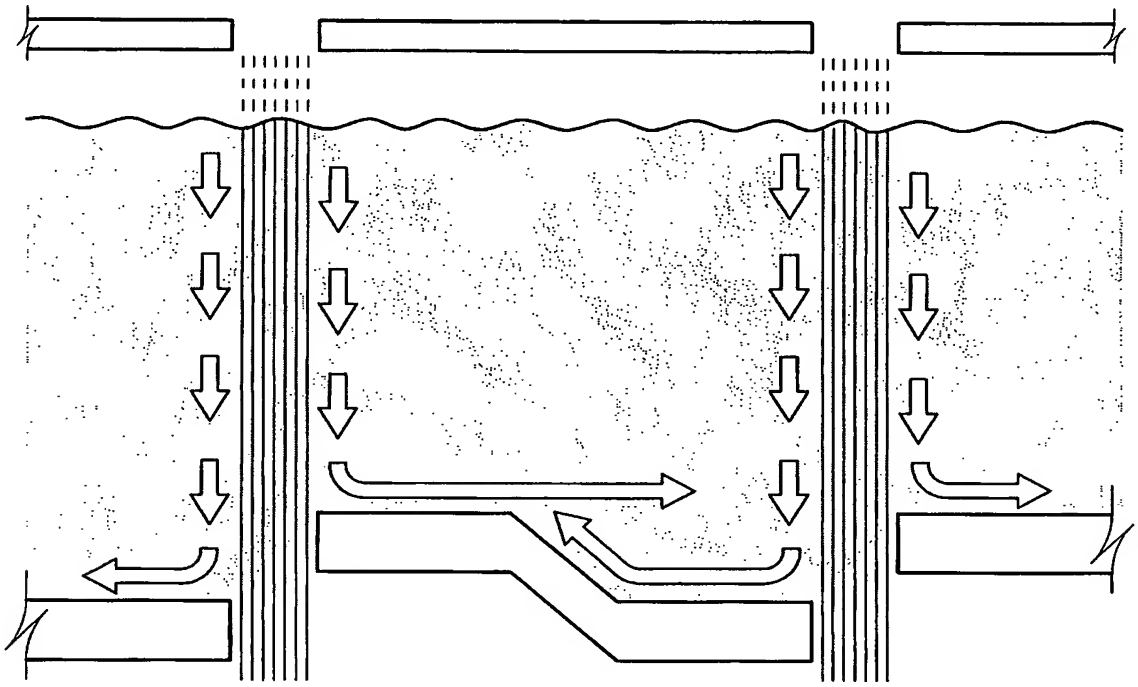
9. Paragraph [0017] of Meerman (APP, ¶ [0010]) indicates that as the outgoing fiber bundle passes through the discharge opening, the edges of the discharge opening stop or scrape off coagulant that is entrained by the bundle.

10. Paragraph [0017] of Meerman (APP, ¶ [0010]) teaches that the stopped/scraped off coagulant retains part of its speed and flows parallel to the bottom towards the adjacent discharge opening; at the same time, coagulant is also flowing from that adjacent discharge opening towards the first discharge opening; this results in collisions of streams flowing in opposite directions.

11. Paragraph [0017] of Meerman (APP, ¶ [0010]) explains that this head-on collision of streams pushes the liquid vertically towards the bath surface, a phenomenon Meerman describes as "damming up"; this disturbs the bath surface, which may cause coagulant to contact the spinneret plate. Below is a schematic drawing illustrating this phenomenon:



12. Paragraph [0018] of Meerman (APP, ¶ [0011]) indicates that if the "aforementioned streams come together at different levels, the disclosed damming up does not arise." Below is a schematic drawing illustrating this phenomenon:



13. The inventors found that the process taught by Meerman does not completely reduce coagulant bath movement in large scale operations. APP, ¶ [0005].

14. APP paragraph [0007] states, "An object of the present invention is to provide a process enabling the high-speed spinning (>300 m/min) of a plurality of filaments having good to very good physical properties, the process conditions being such that commercial production is possible without having disturbing effects of the coagulation bath surface."

15. APP paragraph [0007] continues, "This object is attained by **adapting the process of the state of the art as indicated above** in such a manner that **the positions of the spinning field and the slot or diaphragm** are such that ...."[2]

16. The "process of the state of the art as indicated above" referred to in APP paragraph [0007] is the process taught by Meerman.

17. The phrase "the positions of the spinning field and the slot or diaphragm" refers to elements known from Meerman.

18. Meerman does not use either of the terms "slot" and "diaphragm."

19. APP paragraphs [0005] and [0006], which discuss the process taught by Meerman, make no mention of a slot or diaphragm.

20. APP paragraphs [0005] and [0006] refer to "edges of openings [that] are at different heights" and "more than two spinning fields and a corresponding number of discharge openings."

21. The only antecedent basis for the "slot or diaphragm" described in APP paragraph [0007] is the discharge opening discussed in APP paragraphs [0005] and [0006].

22. The remainder of APP paragraph [0007] describes how the process of Meerman was adapted.

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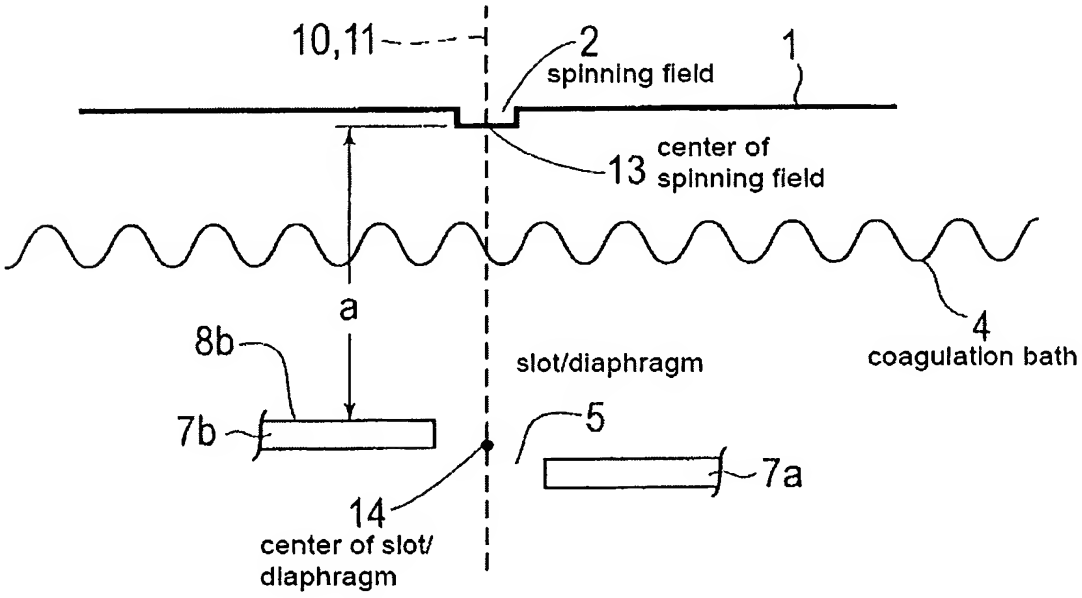
[2] Unless otherwise noted, any emphasis found throughout this brief is added by the Appellants.

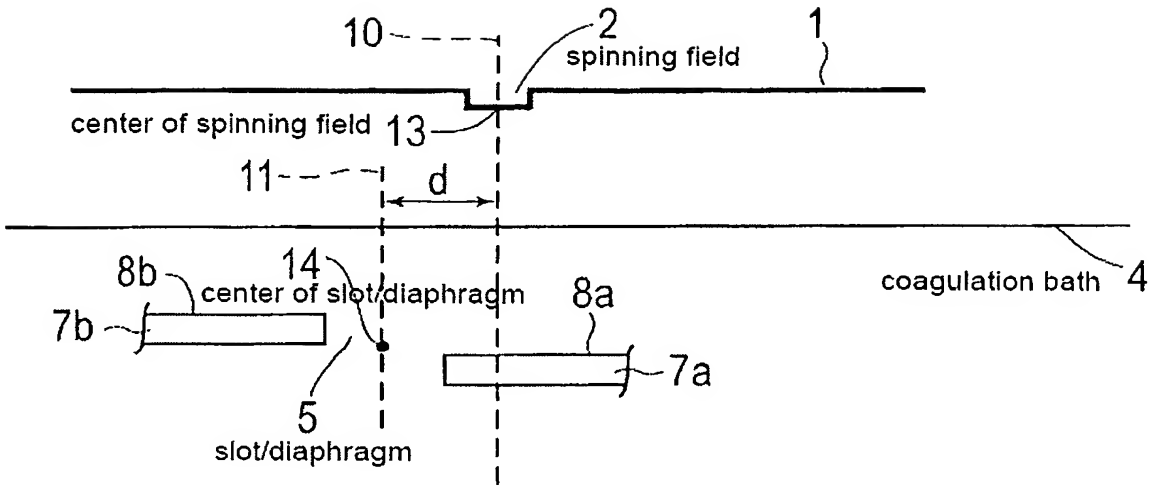
23. APP paragraph [0007] characterizes this adapting of Meerman as the positioning of "the spinning field" in relation to "the slot or diaphragm."

24. This positioning is described as shifting the horizontal position of the slot/diaphragm so that the center of the slot/diaphragm is offset from the horizontal position of the center of a spinning field by a distance d. APP, ¶ [0007]; Figs. 4 and 6.

25. Figure 4, shown below with annotations, is a depiction of a comparative example where d = 0 (no shift). APP, ¶¶ [0025] and [0040].



26. Figure 6, shown below with annotations, is a depiction of an example according to the disclosed invention where the slot/diaphragm is horizontally shifted 1.5 mm (d) in the direction of the upper plate. APP, ¶¶ [0025] and [0043].



27. APP paragraph [0006] states, "It was found that the extent to which the coagulation bath surface is in motion is highly dependent on the **geometry of the coagulation bath's bottom.**"

28. The next sentence of APP paragraph [0006] specifies, "**Particularly,** when use is made of more than two spinning fields and a corresponding number of discharge openings in the bottom of the coagulation bath, the extent to which there is motion at the coagulant surface can be reduced substantially by introducing the **geometry of the present invention.**"

29. The use of the term "particularly" at the beginning of this sentence indicates that this sentence is providing details, specifics, or particulars in reference to the preceding sentence.

30. These two sentences together imply that the "geometry of the present invention" describes or pertains to the "geometry of the coagulation bath's bottom."

31. The "present invention" relates to (1) the configuration of the edges of the slot/diaphragm being at different levels, and (2) the horizontal positioning of the slot/diaphragm in relation to the spinning field. APP, ¶¶ [0007] and [0008], Fig. 6.

32. The "spinning field" is located above the coagulation bath. APP, Figs. 4–6.

33. The "spinning field" is not related to geometry of the coagulant bath's bottom. APP, Figs. 4–6.

34. APP paragraph [0018] discloses that filament bundle convergence may be reduced by providing the opening at the bottom of the bath with a shape that is similar to the shape of a projection of the spinning field, with a width that is narrower than the projection of the spinning field, and a length that is longer than the projection of the spinning field.

35. APP paragraph [0018] then continues, "In that case, neither the length nor the width of the **opening in the bottom of the coagulation bath** will give rise to substantial filament bundle convergence, and the filaments are prevented from being pressed together or suffering damage from scraping along the **edge of the slot or diaphragm**."

36. APP paragraphs [0007] and [0008] discuss the configuration and the horizontal positioning of the slot/diaphragm in relation to the spinning field.

37. APP paragraph [0009] describes how "this process makes it possible" to manufacture a large number of filaments per unit area with a low occurrence of sticking.

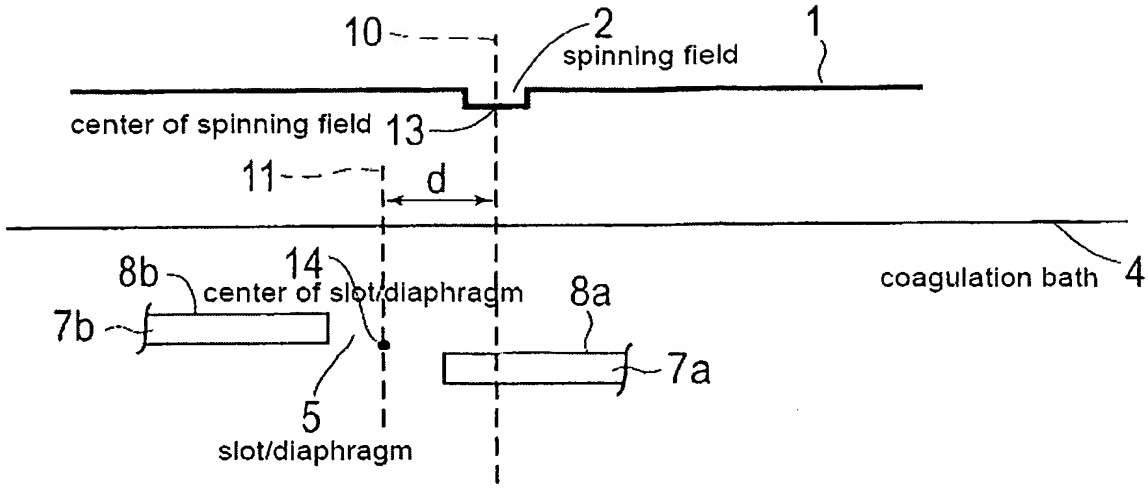
38. "This process" in APP paragraph [0009] refers to the adapted process described in APP paragraphs [0007] and [0008].

39. APP paragraph [0009] then states:

As can be seen from the example, the number of stickings occurring during the process (from filaments making contact before there has been sufficient coagulation of the outer shell) is low. No substantial motion occurred in the coagulation bath. A possible explanation of this phenomenon is given below.

40. The "example" refers to the working example described in APP paragraphs [0034] to [0044], and specifically to the configuration and results obtained described in APP paragraph [0043].

41. The embodiment used in APP paragraph [0043] is depicted in Figure 6, an annotated copy of which is reproduced below.



42. "This phenomenon" referenced in the last sentence of APP paragraph [0009] is the "no substantial motion occurred in the coagulation bath" result obtained by the embodiment used in APP paragraph [0043] and depicted in Figure 6.

43. The phrase "given below" used in the last sentence of APP paragraph [0009] refers to APP paragraphs [0010] to [0011].

44. The explanation of why "no substantial motion occurred in the coagulation bath" used in APP paragraph [0043] and depicted in Figure 6 is found in APP paragraphs [0010] and [0011].

45. APP paragraphs [0010] and [0011] are verbatim of paragraphs [0017] and [0018] of Meerman, and explain the same phenomenon as Meerman.

46. APP paragraphs [0010] and [0011] contrast the effects of coagulant streams flowing from adjacent discharge openings that are at the same level and of coagulant streams flowing from edges of adjacent discharge openings that are at different levels. *See* FACTS 7–12.

47. APP paragraph [0011] describes how "when the **aforementioned streams** come together at **different levels**... the liquid surface remains calm."

48. The "aforementioned streams" discussed in APP paragraph [0011] are the streams discussed in APP paragraph [0010].

49. The effect of streams coming together at different levels described in APP paragraph [0011] is due to the edges of adjacent discharge openings on the bottom of the coagulation bath being at different levels.

50. The Examiner argues that a variety of other configurations can be considered to cause streams to move throughout different levels of the bath. May 2009 Advisory Action ("MAY09 AA"), p. 5.

51. Appellants disagree.

52. The Examiner does not point to any configuration disclosed in the application that supports his position.

53. APP paragraph [0011] specifies that one of the streams is "the one flowing from the lowest edge."

54. This implies that there is also a higher edge, meaning that there are at least two edges at different levels.

55. The discharge openings are located at the bottom of the coagulant bath. APP, ¶¶ [0006] and [0018].

56. APP paragraph [0033] states, "The spinning device is preferably closed with a covering plate just above the slot or diaphragm."

57. The only way the bath could be closed by a covering plate "above" the slot or diaphragm is if the slot or diaphragm is itself positioned at the bottom of the bath, such that the discharge opening in the bottom of the bath is the same as the "slot or diaphragm."

58. If the slot or diaphragm is located at any other location than at the bottom of the bath—for example, some distance above the discharge opening—then the bath could not be "closed" by a plate above such a slot or diaphragm.

59. The Examiner argues, "[A] very straightforward reading of the citation suggests covering the slot or diaphragm itself separate from any linkage to the opening at the bottom. Simply because the discharge opening would not be directly covered in no way requires or implies the argued linkage." MAY09 AA, pp. 5–6.

60. Appellants disagree.

61. The Examiner does not explain how the spinning device could be considered "closed" by covering the slot/diaphragm if the slot/diaphragm is not located at the bottom of the bath.

62. Two Declarations by Dr. Stephen J. Picken were submitted during prosecution. *See* April 2008 Declaration ("DEC A") and October 2008 Declaration ("DEC B") (pages 62 and 73 below).

63. Dr. Picken qualifies as one skilled in the art. DEC A, pp. 2–3.

64. Dr. Picken is not a named inventor in this application. DEC A, p. 3.

65. Dr. Picken states that based on his knowledge of one of ordinary skill in the art, he understands "the specification to clearly describe that the slot or diaphragm is positioned at the bottom of the coagulation bath." DEC A, p. 4.

66. Dr. Picken states, "Indeed, in paragraph [0011] it is mentioned that the design of [the] coagulation bath is such that the fluid surface remains calm due to the balance of the various fluid flow components which I understand to be due to the location and size of the slot or diaphragm at the point of discharge." DEC A, p. 5.

67. Dr. Picken states that if the slot or diaphragm were not positioned at the bottom of the coagulation bath, the filament would suffer damage from scraping along the edge of the slot or diaphragm as it exits the coagulation bath. DEC A, p. 4.

68. The Examiner asserts that the slot or diaphragm does not correspond with the discharge opening because paragraph [0029] requires that all embodiments include a spinning field in combination with a slot or

diaphragm while paragraph [0018] states, "it is preferred to provide the bottom of the coagulation bath per spinning field with an opening." July 15, 2008 Office Action ("JUL08 OA"), p. 4.

69. Appellants disagree.

70. APP paragraph [0018] reads in part:

> To further reduce convergence in the filament bundle or filament bundles it is preferred to provide the bottom of the coagulation bath per spinning field with an opening, the projection of which preferably has a similar shape and is somewhat narrower in width than the projection of the spinning field. Furthermore, if the opening has a somewhat greater length than the spinning field, it facilitates the in-spinning process. In that case, neither the length nor the width of the opening in the bottom of the coagulation bath will give rise to substantial filament bundle convergence, and the filaments are prevented from being pressed together or suffering damage from scraping along the edge of the slot or diaphragm.

71. APP paragraph [0029] reads in part:

> ...In all embodiments, each of the spinning fields 2 is in combination with a slot or diaphragm 5. One slot or diaphragm 5 cannot be in contact (through the spinning fibers) with more than one spinning field 2.

72. Dr. Picken evaluated the statement "it is preferred to provide the bottom of the coagulation bath per spinning field with an opening" and stated that he interpreted "the first occurrence of the term 'preferred' to modify the shape of the openings with regard to the shape of the spinning fields, rather than modifying the presence or absence of the opening, or the location of the opening at the bottom of the coagulation bath." DEC B, p. 5 (original emphasis).

73. Dr. Picken declares "There is no ambiguity in paragraph [0018], because it is impossible to spin a polymer stream to a fiber if the opening is not present at the bottom of the coagulation bath." DEC B, p. 5.

74. Dr. Picken declares, "Additionally, if the diaphragm is not positioned at the bottom of the coagulation bath, then serious turbulence would occur between the diaphragm and the opening in the coagulation bath, which would make transport of the fiber from the diaphragm to the bath opening impossible." DEC B, p. 5.

75. The Examiner acknowledges that his assertion set forth in FACT 68 does not establish beyond all uncertainty that the slot or diagram is not at the bottom of the coagulation bath. December 29, 2008 Final Rejection ("DEC08 FR"), p. 4.

76. The Examiner asserts on page 4 of the May 2009 Advisory Action that he has provided citations from the specification that make it clear the

original specification does not clearly convey or require that the slot or diaphragm is the same as the discharge opening.

77. The only citation from the specification maintained by the Examiner in the May 2009 Advisory Action is the assertion summarized in FACT 68. *See* May09 AA, p. 4, ll. 8–14 and 17–20.

78. The last sentence of APP paragraph [0006] characterizes the invention as a "very simple" embodiment that achieves substantial improvement over Meerman.

IX. ARGUMENT

The Examiner rejects claims 1–7 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement and objects to Amended Figure 2 under 35 U.S.C. §132(a) as adding new matter to the disclosure. Specifically, the Examiner alleges that the feature "the slot or diaphragm is positioned at the bottom of the coagulation bath," added to claims 1 and 2 by amendment, is not supported by the original disclosure. Claims 3–7 are rejected as dependent claims. For the same reasons, the Examiner objects to Amended Figure 2, which was amended to show clearly that the slot/diaphragm and the bottom of the coagulation bath correspond to one another, as required by the claims.

The issue on appeal is whether the specification reasonably conveys to those skilled in the art that the inventors were in possession of the claimed invention as of the date of invention. *See* MPEP §2163.

Appellants present five specific instances where the specification implicitly teaches that the slot/diaphragm is located at the bottom of the coagulation bath, and have provided two Declarations showing why one of skill in the art would understand from the disclosure that the slot/diaphragm must be at the bottom of the coagulation bath and corresponds to the discharge opening.

The Examiner alleges that an internal inconsistency in the specification conclusively establishes that the original specification does not clearly convey

or require that the slot or diaphragm is the same as the discharge opening at the bottom of the bath. FACTS 76, 77. However, this assertion of the Examiner does not outweigh the examples of implicit support found in the specification for the contested feature, or the Declarations provided by Dr. Picken.

Because the record as a whole establishes that the specification conveys with reasonable clarity to those skilled in the art that the inventors were in possession of the claimed invention at the time of filing, Appellants respectfully request that the Board reverse the rejection of claims 1–7 and the objection to Amended Figure 2.

A. The Background Of The Invention Helps Establish The Standpoint Of One Of Skill In The Art At The Time The Application Was Filed

The MPEP provides that the analysis of whether the specification complies with the written description requirement is to conducted from the standpoint of one of skill in the art at the time the application was filed. MPEP §2163(II)(A)(2), citing *Wang Labs. v. Toshiba Corp.*, 993 F.2d 858, 865 (Fed. Cir. 1993). The background of the invention, discussed below, helps establish that standpoint.

The "present invention" is an improvement of the processes and devices taught by European Patent No. 0,904,431 ("Meerman"). FACTS 1–16. Meerman generally relates to a process for manufacturing synthetic filaments where a spinning solution is forced through orifices of a spinneret, and then

passed through an air gap and a coagulation bath in succession, and then through a discharge opening located at the bottom of the bath. FACTS 1 and 2.

One of the problems concerning Meerman was that motion in the coagulation bath causes coagulant to splash up and contact the spinneret plate, especially when a very small air gap is used. FACT 3. Meerman teaches that coagulant splashing is reduced substantially by configuring the edges of adjacent discharge openings at the bottom of the bath be on different levels. FACTS 5, 7, and 9–12.

The present inventors found that the process taught by Meerman does not completely reduce coagulant bath movement in large scale operations. FACT 13. They describe the "present invention" as an adaptation of Meerman, which they also describe as a "very simple" embodiment that achieves substantial improvement over Meerman. FACTS 15 and 78.

B. Implicit Support For The Slot Or Diaphragm Being Located At The Bottom Of The Coagulation Bath Is Found Throughout The Specification

Discussed below are five instances where the specification implicitly supports the contested feature.

1. Paragraph [0006] Teaches That "The Geometry Of The Present Invention" Specifically Relates To The "Geometry Of The Coagulation Bath's Bottom"

Appellants have previously argued that the geometry of the slot or diaphragm is the "geometry of the coagulation bath's bottom" described in

paragraph [0006]. *See* April 28, 2009 Request for Reconsideration After Final Rejection ("APR09 RRAFR"), p. 5. The Examiner argues that the word "geometry" does not expressly, implicitly, or inherently link the location of the slot or diaphragm and the discharge opening. *See* MAY09 AA, p. 5. Appellants' following response includes new arguments that have not been previously presented to the Examiner.

Contrary to the Examiner's conclusory statement, paragraph [0006] establishes that "the geometry of the present invention" is specifically describing the "geometry of the coagulation bath's bottom." FACTS 27–30. Paragraph [0006] reads in part:

> It was found that the extent to which the coagulation bath surface is in motion is highly dependent on the geometry of the coagulation bath's bottom. **Particularly**, when use is made of more than two spinning fields and a corresponding number of discharge openings in the bottom of the coagulation bath, the extent to which there is motion at the coagulant surface can be reduced substantially by introducing the geometry of the present invention.

The use of the term "particularly" links the two sentences together, signaling the reader that the second sentence is providing specific examples or particulars of the preceding sentence. FACT 29. These two sentences, linked by the term "particularly," implicitly, if not expressly, establish that the "geometry of the

present invention" specifically relates to the "geometry of the coagulation bath's bottom." FACT 30.

The "present invention" pertains to (1) the configuration of the edges of the slot/diaphragm being at different levels, and (2) the horizontal positioning of the slot/diaphragm in relation to the spinning field. FACTS 22–25 and 31. Thus, the feature of the present invention that specifically relates to the geometry of the coagulation bath's bottom must be either the slot/diaphragm or the spinning field.

Because the spinning field is located above the bath, it does not relate to the geometry of the coagulation bath's bottom. FACTS 32 and 33. This leaves the configuration of the slot/diaphragm as the only feature of the "present invention" that could relate to the coagulation bath's bottom. Thus, "the geometry of the present invention" that specifically relates to "the geometry of the coagulation bath's bottom" is the geometry of the slot/diaphragm.

2. The Only Antecedent Basis For The "Slot Or Diaphragm" Described In Paragraph [0007] Is The Discharge Opening Discussed In Paragraphs [0005] And [0006]

The following is a new argument that has not been previously presented to the Examiner.

Paragraph [0007] teaches that an object of the present invention is "attained by **adapting the process of the state of the art** as indicated above in such a manner that **the positions of the spinning field** and **the slot or**

diaphragm are such that ...." The only antecedent basis for "the slot or diaphragm" is the discharge opening discussed in paragraphs [0005] and [0006] of the specification. FACTS 13–21.

Because the only antecedent basis for "the slot or diaphragm" is the discharge opening, and because the discharge opening is located at the bottom of the bath (*see* FACT 55), this implies that the slot or diaphragm is located at the bottom of the bath.

3. The Terms "Opening" And "Slot Or Diaphragm" Are Used Interchangeably In Paragraph [0018]

The following arguments have been previously presented to the Examiner. *See* APR09 RRAFR, p. 6

Paragraph [0018] discloses that filament bundle convergence may be reduced by providing the opening at the bottom of the bath with a shape that is similar to the shape of a projection of the spinning field, with a width that is narrower than the projection of the spinning field, and a length that is longer than the projection of the spinning field. FACT 34.

Paragraph [0018] then continues, "In that case, neither the length nor the width of the **opening in the bottom of the coagulation bath** will give rise to substantial filament bundle convergence, and the filaments are prevented from being pressed together or suffering damage from scraping along the **edge of the slot or diaphragm**." FACT 35.

This statement only makes sense if the "slot or diaphragm" is the same as the "opening at the bottom of the coagulation bath." Otherwise, if the slot or diaphragm and the discharge opening are separate features, then the shape of the discharge opening would not prevent the filament bundle from "scraping along the edge of the slot or diaphragm." This is attested to by Dr. Picken, who indicates that if the slot or diaphragm is not positioned at the bottom of the coagulation bath, the filament would suffer damage from scraping along the edge of the slot or diaphragm as it exits the coagulation bath. FACT 67.

4. Paragraphs [0009] To [0011] Teach That The Discharge Opening Corresponds To The Slot/Diaphragm Depicted In Figure 6

Appellants have previously argued that the streams moving at "different levels" discussed in paragraph [0011] arise from plates forming the edges of the discharge openings being at different levels. *See* APR09 RRAFR, pp. 5–6. The Examiner disagrees, arguing that a variety of other configurations can be considered to cause streams to move throughout different levels of the bath. FACT 50. As an example, he states that "as the streams flow in opposite directions and hit the walls of the bath they will then move throughout different levels of the bath." MAY09 AA, p. 5. Appellants' following response includes new arguments that have not been previously presented to the Examiner.

Paragraph [0009] indicates that paragraphs [0010] and [0011] provide a "possible explanation" as to how no substantial coagulation bath motion is

achieved by the embodiment described in paragraph [0043] and depicted in Figure 6. FACTS 36–44. Paragraphs [0010] and [0011] contrast the effects of coagulant streams flowing from adjacent discharge openings that are at the same level and of coagulant streams flowing from edges of adjacent discharge openings that are at different levels. FACTS 45–49, 7–12.

The Examiner does not point to any configuration disclosed in the application that supports his position. FACT 52. Additionally, paragraph [0011] discusses the "aforementioned streams" and specifies that one of the streams is "the one flowing from the lowest edge." FACTS 47, 48, 53. This implies that there is also a higher edge, meaning that there are at least two edges at different levels. FACT 54.

Moreover, as discussed above, paragraph [0009] teaches that paragraphs [0010] and [0011] explain why the configuration depicted in Figure 6 leads to no substantial coagulation bath motion. FACTS 36–44. Figure 6 depicts edges of the opening being at different levels. FACT 26. Paragraphs [0010] and [0011] explain that discharge openings with edges at different levels leads to a calm coagulation bath surface. FACTS 45–49, 7–12. Thus, paragraphs [0009] to [0011] teach that the slot/diaphragm configuration depicted in Figure 6 implicitly corresponds to the discharge opening with edges at different levels discussed in paragraphs [0010] and [0011]. Because the discharge opening is

located at the bottom of the bath (*see* FACT 55), this implies that the slot or diaphragm is located at the bottom of the bath.

5. Paragraph [0033] Teaches That The Spinning Device Can Be Closed By Covering The Slot Or Diaphragm

Paragraph [0033] states, "The spinning device is preferably closed with a covering plate just above the slot or diaphragm." FACT 56. As previously explained to the Examiner, the only way the bath could be closed by such a covering plate "above" the slot or diaphragm is if the slot or diaphragm is itself positioned at the bottom of the bath, such that the discharge opening in the bottom of the bath is the same as the "slot or diaphragm." *See* APR09 RRAFR, pp. 6–7; FACT 57. If the slot or diaphragm was located at any location other than at the bottom of the bath—for example, some distance above the discharge opening—then the bath would not be "closed" by a plate above such a slot or diaphragm. *See* APR09 RRAFR, p. 7; FACT 58.

The Examiner disagrees, arguing, "[A] very straightforward reading of the citation suggests covering the slot or diaphragm itself separate from any linkage to the opening at the bottom. Simply because the discharge opening would not be directly covered in no way requires or implies the argued linkage." MAY09 AA, pp. 5–6; FACT 59. The following response has not been previously presented to the Examiner.

The Examiner does not explain how the spinning device could be considered "closed" by covering the slot/diaphragm if the slot/diaphragm is not

located at the bottom of the bath. FACT 61. If the bottom of the bath is not closed, how can the device be closed? Put another way, if a house has an exterior door and an interior door, how would closing the interior door close the house?

C. The Examiner's Position

The Examiner asserts that the slot or diaphragm does not correspond with the discharge opening because paragraph [0029] requires that all embodiments include a spinning field in combination with a slot or diaphragm while paragraph [0018] states, "It is preferred to provide the bottom of the coagulation bath per spinning field with an opening." FACTS 68–71.

In response to arguments previously made of record, the Examiner acknowledges that his assertion does not establish beyond all uncertainty that the slot or diagram is not at the bottom of the coagulation bath. FACT 75. The Examiner maintains that his combination of paragraphs [0018] and [0029] implies/suggests that the slot or diaphragm is not at the bath bottom and "makes it clear the original specification does not clearly convey or require that the slot or diaphragm is the same as the discharge opening." FACT 76.

It appears that the Examiner takes the position that any degree of uncertainty is sufficient to establish a lack of written description support. If so, he would be incorrect. Absolute certainty is not the standard; rather, "the fundamental factual inquiry is whether the specification conveys with

reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed." *See* MPEP §2163.02, citing *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991).

That a specification may disclose in one section that a feature is preferred and in another section that the feature is required, indicates an internal inconsistency, not an irreconcilable contradiction. The fact that a feature is required in "all embodiments" does not contradict the fact that the feature is preferred. Indeed, all this signifies is that the feature is so preferred that all embodiments are required to have the feature.

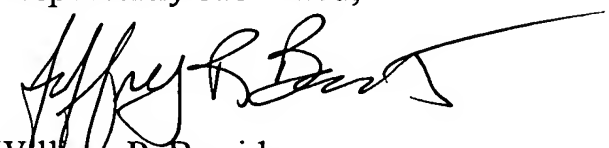
When considered in a vacuum, the language noted by the Examiner at most suggests that the discharge opening and the slot/diaphragm may be separate, distinct features. Looking at the disclosure as a whole, however, would clearly convey to those skilled in the art that this is not the case. As discussed above, paragraph [0006] implicitly links the geometry of the slot/diaphragm to the geometry of the coagulation bath's bottom. Paragraph [0007] implicitly links "the slot or diaphragm" to the discharge opening discussed in paragraphs [0005] and [0006]. Paragraphs [0009] to [0011] implicitly link a discharge opening with edges at different levels to the slot/diaphragm configuration depicted in Figure 6. Paragraph [0018] uses the phrases "opening in the bottom of the coagulation bath" and "slot or opening"

interchangeably in the same sentence. Paragraph [0033] teaches that the spinning device can be closed with a covering plate just above the slot or diaphragm, which implies that the slot or diaphragm is the discharge opening at the bottom of the bath. Further, two Declarations from Dr. Picken indicate why one of ordinary skill in the art would understand from the original disclosure that the slot or diaphragm must be located at the bottom of the bath and corresponds with the discharge opening. FACTS 62–66 and 72–74.

*****

For all of the reasons discussed above, it is respectfully submitted that the rejection and objection are in error, that claims 1–7 are in condition for allowance, and that Amended Figure 2 does not introduce new matter. For all of the above reasons, Appellants respectfully request this Honorable Board to reverse the rejection of claims 1–7 and the objection to Amended Figure 2.

Respectfully submitted,



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X. APPENDIX A - CLAIMS SECTION

1. (Rejected) A method for manufacturing filaments from an optically anisotropic spinning solution comprising extruding the spinning solution through a spinneret comprising a spinning field with a plurality of spinning orifices into a coagulation bath through a slot or diaphragm, the edges of the slot or diaphragm being formed by plates with upper sides and lower sides, the upper side of each plate being defined as the side having the shortest distance to the spinning field, wherein a line through the center of the spinning field and perpendicular to the upper sides is located at a distance (d) from a parallel line through the center of the slot or diaphragm, wherein the slot or diaphragm has substantially the same size and shape as the spinning field, and wherein the plane of the upper side of one of the plates has a shorter distance to the center of the spinning field than the plane of the upper side of the other of the plates, and the line through the center of the spinning field has a smaller distance to the edge of one of the plates than to the edge of the other of the plates, and wherein the slot or diaphragm is positioned at the bottom of the coagulation bath.

2. (Rejected) An air gap spinning device comprising a spinneret comprising a spinning field with a plurality of spinning orifices, and a slot or diaphragm with edges formed by plates with upper sides and lower sides, the upper side of each plate being defined as the side having the shortest distance

to the spinning field, wherein a line through a center of the spinning field and perpendicular to the upper sides has a distance (d) from a parallel line through the center of the slot or diaphragm, wherein the slot or diaphragm has substantially the same size and shape as the spinning field, and wherein the plane of the upper side of one of the plates has the shorter distance to the center of the spinning field than the plane of an upper side of the other of the plates, and the line through the center of the spinning field has a smaller distance to the edge of the plate of which the upper side has the longest distance to the center of the spinning field than to the edge of the other of the plates, and wherein the slot or diaphragm is positioned at the bottom of the coagulation bath.

3. (Rejected) The air gap spinning device of claim 2, wherein the thickness of each of the plates is independently about 0.5 to 5 mm.

4. (Rejected) The air gap spinning device of claim 2, wherein the distance (d) between the line through the center of the spinning field and the parallel line through the center of the slot or diaphragm is about 0.4 to 50 mm.

5. (Rejected) The air gap spinning device of claim 2, wherein the distance (d) between the line through the center of the spinning field and the parallel line through the center of the slot or diaphragm is about 1 to 2 mm.

6. (Rejected) The air gap spinning device of claim 2, wherein the thickness of each of the plates is about the same as the distance (d) between the

line through the center of the spinning field and the parallel line through the center of the slot or diaphragm.

7. (Rejected) The air gap spinning device of claim 2, wherein both the spinning field and the slot or diaphragm have a rectangular shape, and wherein the slot or diaphragm has a smaller width and is longer than the spinning field.

XI. APPENDIX B - CLAIM SUPPORT AND DRAWING ANALYSIS SECTION

1. A method for manufacturing filaments from an optically anisotropic spinning solution comprising extruding the spinning solution through a spinneret {**[0026]-[0027]; Figure 1, element 1; Figure 2, element 1**} comprising a spinning field {**[0026]-[0027]; Figure 1, element 2; Figure 2, element 2**} with a plurality of spinning orifices {**[0026]-[0027]; Figure 1, element 3; Figure 2, element 3**} into a coagulation bath {**[0027]; Figure 2, element 4**} through a slot or diaphragm {**[0027]; Figure 2, element 5; Figure 3, element 5**}, the edges {**[0027]; Figure 2, elements 6a, 6b; Figure 3, element 6a**} of the slot or diaphragm being formed by plates {**[0027]; Figure 2, elements 7a, 7b; Figure 3, elements 7a, 7b**} with upper sides and lower sides {**[0027]; Figure 2, elements 8a, 8b; Figure 3, elements 8a, 8b**}, the upper side of each plate being defined as the side having the shortest distance to the spinning field, wherein a line {**[0027]; Figure 2, element 10**} through the center {**[0027]; Figure 2, element 13**} of the spinning field and perpendicular to the upper sides is located at a distance (d) from a parallel line {**[0027]; Figure 2, element 11**} through the center {**[0027]; Figure 2, element 14**} of the slot or diaphragm, wherein the slot or diaphragm has substantially the same size and shape as the spinning field, and wherein the plane of the upper side of one of the plates has a shorter distance to the center of the

spinning field than the plane of the upper side of the other of the plates, and the line through the center of the spinning field has a smaller distance to the edge of one of the plates than to the edge of the other of the plates, and wherein the slot or diaphragm is positioned at the bottom of the coagulation bath.

2. An air gap spinning device comprising a spinneret {**[0026]-[0027]; Figure 1, element 1; Figure 2, element 1**} comprising a spinning field {**[0026]-[0027]; Figure 1, element 2; Figure 2, element 2**} with a plurality of spinning orifices {**[0026]-[0027]; Figure 1, element 3; Figure 2, element 3**}, and a slot or diaphragm {**[0027]; Figure 2, element 5; Figure 3, element 5**} with edges {**[0027]; Figure 2, elements 6a, 6b; Figure 3, element 6a**} formed by plates {**[0027]; Figure 2, elements 7a, 7b; Figure 3, elements 7a, 7b**} with upper sides and lower sides {**[0027]; Figure 2, elements 8a, 8b; Figure 3, elements 8a, 8b**}, the upper side of each plate being defined as the side having the shortest distance to the spinning field, wherein a line {**[0027]; Figure 2, element 10**} through a center {**[0027]; Figure 2, element 13**} of the spinning field and perpendicular to the upper sides has a distance (d) from a parallel line {**[0027]; Figure 2, element 11**} through the center {**[0027]; Figure 2, element 14**} of the slot or diaphragm, wherein the slot or diaphragm has substantially the same size and shape as the spinning field, and wherein the plane of the upper side of one of the plates has the shorter distance to the center of the spinning field than the plane of an upper side of the other of the plates, and the

line through the center of the spinning field has a smaller distance to the edge of the plate of which the upper side has the longest distance to the center of the spinning field than to the edge of the other of the plates, and wherein the slot or diaphragm is positioned at the bottom of the coagulation bath {**[0027]; Figure 2, element 4**}.

3. The air gap spinning device of claim 2, wherein the thickness of each of the plates is independently about 0.5 to 5 mm {**[0030]**}.

4. The air gap spinning device of claim 2, wherein the distance (d) between the line through the center of the spinning field and the parallel line through the center of the slot or diaphragm is about 0.4 to 50 mm{**[0031]**}.

5. The air gap spinning device of claim 2, wherein the distance (d) between the line through the center of the spinning field and the parallel line through the center of the slot or diaphragm is about 1 to 2 mm{**[0031]**}.

6. The air gap spinning device of claim 2, wherein the thickness of each of the plates is about the same as the distance (d) between the line through the center of the spinning field and the parallel line through the center of the slot or diaphragm{**[0032]**}.

7. The air gap spinning device of claim 2, wherein both the spinning field and the slot or diaphragm have a rectangular shape, and wherein the slot or diaphragm has a smaller width and is longer than the spinning field {**[0017]-[0018]**}.

XII. APPENDIX C - MEANS OR STEP PLUS FUNCTION ANALYSIS SECTION

NONE

XIII. APPENDIX D - EVIDENCE SECTION

A copy of each of the following items of evidence relied on by the Appellant and/or the Examiner in this appeal is attached:

Table of Contents

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(54) PROCESS FOR MANUFACTURING FILAMENTS FROM AN OPTICALLY ANISOTROPIC SPINNING SOLUTION

ELEKTRISCH BEHEIZBARER, IN TEILBEREICHE UNTERTEILTER WABENKORPER MIT VERBINDUNGSSTEGEN

PROCEDE DE FABRICATION DE FILAMENTS A PARTIR D'UNE SOLUTION A FILER OPTIQUEMENT ANISOTROPE

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DE-C- 820 948
FR-A- 1 102 056

- **PATENT ABSTRACTS OF JAPAN vol. 014, no. 318 (C-0738), 9 July 1990 & JP,A,02 112409 (ASAHI CHEM IND CO LTD), 25 April 1990,**

EP 0 904 431 B1

Description

[0001] The invention pertains to a process for manufacturing filaments from an optically anisotropic spinning solution in which the spinning solution is extruded through spinning orifices grouped in at least one spinning section and in which the extrudates are passed through an inert gas and a coagulation bath in succession.

[0002] Such a process is known from Japanese laid-open No. 1986-239012, which describes a method of spinning filaments from poly(para-phenylene-terephthalamide) (PPTA) where the filaments are spun through spinning orifices grouped to form a rectangle. The ratio of the rectangle's long side length to its short side length has to be at least 4. In the coagulation bath a hole, also rectangular, is provided beneath the spinning section. Since both the spinning section and the hole in the coagulation bath are rectangular, the bundle of filaments is rectangular also. As a result of this rectangular shape of the bundle, very few vortexes are created in the coagulant, a portion of which is discharged from the coagulation bath together with the filaments. This leads to a substantial reduction of filamentation in the coagulation bath (where the filaments are not yet fully coagulated) and makes it possible to increase the spinning speed.

[0003] In the examples of said Japanese patent specification filaments of good strength are made. This strength is to be attributed first of all to the coagulant's low concentrations of sulphuric acid (0 and 10%) and the wideness on average of the spacing of the spinning orifices (the so-called pitch). The low acid concentration, which can only be maintained by treating the coagulant and replenishing it, and the large pitch, which makes it necessary to employ a large apparatus in relation to the number of produced filaments, make the described process into an expensive one with a very large waste stream.

[0004] Furthermore, at high spinning speeds there will have to be a subatmospheric pressure beneath the coagulation bath, this in order to further accelerate the speed of the coagulant and so reduce the tension in the filaments.

[0005] If in the process according to the Japanese patent specification the pitch of the spinning orifices is reduced in order to increase their number (and hence the number of filaments) per unit of area, the filaments in the coagulation bath will stick together at the spinning speeds mentioned, rendering the end product unsuitable for use in the envisaged high-grade applications (e.g., woven fabrics or composite reinforcement).

[0006] The invention has for its object to provide a process enabling the highspeed spinning (≥300 m/min) of a plurality of filaments having good to very good physical properties. This object is attained by providing a process for manufacturing filaments from an optically anisotropic spinning solution in which the spinning solution is extruded through spinning orifices grouped in at least one spinning section and the extrudates are passed through an inert gas and a coagulation bath in succession, characterised in that the spinning section or spinning sections are rectangular, and that the ratio of the pitch to the width of the spinning section is more than 0.15 and less than 0.7, the pitch being defined as the average distance between the spinning orifice centres of adjacent spinning orifices, and the width of the spinning section is less than 5 mm.

[0007] Preferably, said ratio (which is easily calculated by dividing the pitch, in millimeters, by the width of the spinning section, also in millimeters) is in the range of 0.20 to 0.55, the spinning section has a width in the range of 1.5 to 4 mm, and the pitch is in the range of 0.3 to 0.7 mm.

[0008] Surprisingly, it was found that using this process makes it possible to manufacture filaments having good physical properties at a small pitch (and hence a large number of filaments per unit of area) at a comparatively high acid concentration in the coagulation bath, resulting in an economical process with a small waste stream. As can be seen from the example, the number of stickings occurring during the process (from filaments making contact before there has been sufficient coagulation of the outer shell) is low.

[0009] The process according to the invention makes it possible to use a comparatively compact spinning apparatus or to equip existing spinning apparatus with spinneret plates with a higher number of spinning orifices. For instance, the production of an existing spinning apparatus can be increased from 1000 to 2000 or 3000 filaments per spinning position.

[0010] The favourable results are probably attributable to the low resistance experienced by the coagulant as it flows to the core of the filament bundle (alternatively, this may be referred to as high filament bundle permeability). The resistance depends on the route to be travelled, i.e., half of the width of the filament bundle, and the space between the various filaments (the pitch).

[0011] Preferably, the spinning orifices are grouped in more than one spinning section. The separate sections can then be positioned vis-à-vis one another such as to ensure the least possible hindrance of the coagulant's approaching flow and the fullest possible avoidance of disturbing the coagulation bath.

[0012] Also, the separate spinning sections preferably are positioned such that the maximum space between the outermost fibres is relatively small at the moment of extrusion from the spinning orifices of the different spinning sections, so that the convergence to, say, a guide may be low.

[0013] One highly effective way of positioning the rectangular spinning sections takes the form of the spinning sections being distributed equidistantly over a circle, with the longitudinal direction of each of the spinning sections coinciding with a radius. Such positioning hinders the approaching flow of the coagulant hardly (if at all) and gives a low

convergence for each of the filament bundles.

[0014] To further reduce convergence in the filament bundle or filament bundles it is preferred to provide the bottom of the coagulation bath per spinning section with a rectangular opening which has a greater length than the spinning section and is somewhat narrower in width. In that case neither the length nor the width of the opening in the bottom of the coagulation bath will give rise to filament bundle convergence, and the filaments are prevented from being pressed together or suffering damage from scraping along the edge of the opening.

[0015] The physical properties of the filaments obtained by the process according to the invention can be enhanced still further by selecting a range for the distance travelled by the threadlike extrudates through the gaseous inert medium (the air gap) of more than 0.5 mm and less than 8 mm.

[0016] When very small air gaps are employed (say, smaller than 2 mm), there is a risk of the coagulant, which will always display some motion under the influence of the filament bundle (vibrations, small waves, etc.), making contact with the spinneret plate. When this happens, the process may be disturbed to such a degree as will require it to be stopped. Hence, if very small air gaps are to be used, it is of the essence to have the calmest possible coagulation bath surface. Surprisingly, it was found that the extent to which the coagulation bath surface is in motion is highly dependent on the geometry of the coagulation bath's bottom. If use is made of more than two spinning sections and a corresponding number of discharge openings in the bottom of the coagulation bath, the extent to which there is motion at the coagulant surface can be reduced substantially by introducing variations in height in or on the bottom. A very simple and effective embodiment of this is the one where the edges of adjacent openings are at different heights ("on different levels"). A possible explanation of this phenomenon is given below.

[0017] At the edges of the discharge openings the liquid which is entrained by the outgoing filament bundle is stopped or scraped off. Because of inertia, the liquid retains (part of) its speed and flows parallel to the bottom in the direction of the adjacent discharge opening. However, coagulant flow approaches also from the direction of this adjacent discharge opening, resulting in the collision of streams flowing in opposite directions. The liquid is pushed up as a result, and the coagulation bath surface rises above this stagnation point. Obviously, the damming up of the coagulant constitutes a significant restriction when selecting the air gap; after all, the coagulant has to be prevented from making contact with the spinneret plate.

[0018] When the aforementioned streams come together at different levels, the disclosed damming up does not arise. On the contrary, because the speed of one of the streams (i.e., the one flowing from the lowest edge) already has a component going in the direction of the liquid surface, there is extinction and the liquid surface remains calm.

[0019] When the coagulation bath has a depth of more than 10 mm and less than 20 mm (preferably less than 15 mm), on the one hand the filaments encounter only slight resistance in the bath and the use of coagulant is low, and on the other hand the residence time in the coagulation bath is long enough to achieve the required coagulation.

[0020] It should be noted that EP 172 001 discloses a process for spinning aramid yarns in which use is made of rectangular spinning sections of narrow width and a small pitch. However, this process is substantially different from the process according to the invention, since the coagulant is not contained in a bath but supplied in the form of a waterfall. Because of the strong current in the waterfall and the small number of rows of filaments, the resistance encountered by the coagulant in the filament bundle does not play an essential part.

[0021] The process according to EP 172 001 involves very high coagulant consumption. Moreover, in the examples only water (0% sulphuric acid) is employed. As a result, the (very large) stream of coagulant has to be subjected to extensive post-treatment and/or neutralisation.

[0022] It should also be noted that in Japanese laid-open No. 1985-065110 a process is described which uses a spinneret plate having 2 spinning sections each with 50 spinning orifices. The pitch is 1.5 mm, giving a small number of filaments per unit of area.

[0023] The coagulant used in the process in question is water containing 0% or 10% of sulphuric acid, so this process is likewise attended with a large waste stream.

[0024] It is noted that FR-A-1 102 056 (filing date June 16, 1947) discloses a very small spinneret with a large number of spinning orifices. Such spinnerets can only be used in true wet spinning processes, i.e., those spinning processes which do not comprise an air gap (for instance, viscose spinning) and wherein the extruded filaments are immediately contacted with the coagulant and coagulated. True wet spinning processes therefore are not confronted with filament sticking and problems occurring at the free surface of the coagulant. Further, in said publication it is prescribed that if the spinning orifices are grouped in spinning sections, the width of the groups should not exceed two orifices, whereas the invention allows greater widths.

[0025] EP-A-0 168 879 pertains to a process involving the use of two or more separate, spaced spinning sections. The sections according to EP-A-0 168 879 are rather large and filaments obtained with this process leave much to be desired in terms of mechanical properties and yarn regularity, especially if the process is carried out at high speed.

[0026] Within the framework of the invention the term pitch is used to indicate the average distance between the spinning orifice centres of adjacent spinning orifices.

[0027] The invention will be further illustrated below with reference to an example and figures. Needless to say, the

invention is illustrated but not limited by this example.

Figure 1 shows a bottom view of a spinneret according to the invention provided with eight rectangular spinning sections.

Figure 2 shows two of the eight spinning sections of the spinneret according to Figure 1 in greater detail.

Figure 3 shows a bottom view of a spinneret serving as comparative example.

Figure 4 shows one of the spinning sections of the spinneret according to Figure 3 in greater detail.

EXAMPLE

[0028] In analogous manner to the procedure described in Example 6 of US 4,308,374 poly(para-phenylene terephthalamide) was prepared using a mixture of N-methyl pyrrolidone and calcium chloride. After neutralisation, washing, and drying a polymer having an inherent viscosity of 5.4 was obtained.

[0029] The polymer was dissolved in sulphuric acid of 99.8% concentration in the manner described in Example 3 of US 4,320,081. The thus prepared spinning solution had a polymer concentration of 19.4%.

[0030] The spinning solution was spun using different spinnerets.

[0031] A first circular spinneret 1, depicted in Figures 1 and 2, having an outer diameter of 57 mm (in the Table this spinneret is indicated with the code S1) was provided with eight rectangular spinning sections 2 (2.58 mm wide, indicated with 3 in Figure 1, and 9 mm long) each having 125 spinning orifices 4. The spinning orifices 4 had a diameter of 65 µm and a distance of one to the other (pitch) 5 of 0.5 mm (the ratio of the pitch 5 to the width 3 of the spinning section 2 thus was 0.2).

[0032] A second circular spinneret 6, depicted in Figures 3 and 4 (in the Table this spinneret is indicated with the code S2), serving as a comparative example, had an outer diameter of 57 mm and was provided with four spinning sections 8 (having a constant width 7 of 9.5 mm) each following the curve of the circumference of the circular spinneret and each comprising 250 spinning orifices. The spinning orifices had a diameter of 65 µm and a distance of one to the other 9 of 1.0 mm (the ratio of the pitch 9 to the width 7 of the spinning section 8 thus was 0.11).

[0033] The spinning solution was spun through an air gap, as indicated in the Table. The same-level or flat bottom of the coagulation bath (having a depth of 10 mm) was provided with eight and four openings, respectively (S1: rectangular 2.0 mm x 15 mm; S2: circular with a diameter of 5 mm) each positioned directly beneath a spinning section.

[0034] The coagulant was made up of water having a sulphuric acid concentration of 20% and a temperature of 10°C. The spinning speeds and the draw ratios are indicated in the Table. The physical properties were determined in accordance with ASTM D885.

[0035] The term fluffs is used to indicate various irregularities (resulting from breaks, filament lapping around rolls, etc.) in the manufactured yarn.

[0036] The degree of sticking was evaluated visually. 1 indicates that there was little or no sticking (less than 1% of the filaments subject to sticking), 5 indicates a very strong degree of sticking (over 25% of the filaments subject to sticking).

TABLE

Spinning rate (m/min)		300	400	300	400	300
Draw ratio		7.1	9.5	7.1	9.5	7.1
Spinneret S1		Tenacity (mN/tex):		Fluffs per 15 min):		Sticking (-):
Air gap	3 mm	2218	2162	0	1	1
	4 mm	2179	2143	1	0	1
	6 mm	2181	2177	0	0	1
	8 mm	2158	2032	2	1	1
Spinneret S2						
Air gap	8 mm	1912	1879	5	40	4
	8 mm	1864	1873	1	34	4
	8 mm	1902	1955	5	33	4
	8 mm	1921	1953	4	6	4

[0037] The filaments manufactured using S1 have significantly higher tenacity than those made using S2. Also, the number of stickings is far lower. Furthermore, in view of the available space, the number of spinning sections in a

spinneret such as S1 can be increased to, say, 12 or 16, whereas S2 provides no such opportunity.

[0038] A third circular spinneret (S3; this spinneret, unless specified otherwise, corresponds to S1) having an outer diameter of 75 mm was provided with eight rectangular spinning sections (2.58 mm wide and 18 mm long) each having 250 spinning orifices, giving 2000 filaments in all. The spinning orifices had a diameter of 65 µm and were spaced 0.5 mm apart.

[0039] Spinneret S3 was used to spin the spinning solution described above (under conditions which, unless specified otherwise, correspond to those disclosed above) employing an air gap of 6 mm and a spinning speed of 300 m/min. The resulting yarn had a tenacity of 2202 mN/tex. The number of fluffs per 15 minutes was 4, and there was no sticking.

Claims

1. A process for manufacturing filaments from an optically anisotropic spinning solution in which the spinning solution is extruded through spinning orifices grouped in at least one spinning section and the extrudates are passed through an inert gas and a coagulation bath in succession, characterised in that the spinning section or spinning sections are rectangular, and that the ratio of the pitch to the width of the spinning section is more than 0.15 and less than 0.7, the pitch being defined as the average distance between the spinning orifice centres of adjacent spinning orifices, and the width of the spinning section is less than 5 mm.

2. A process according to claim 1, characterised in that the spinning orifices are grouped in more than one spinning section.

3. A process according to claim 2, characterised in that the spinning sections are distributed equidistantly over a circle, and the longitudinal direction of each of the spinning sections coincides with a radius.

4. A process according to claim 2 or 3, characterised in that the bottom of the coagulation bath is provided per spinning section with a rectangular opening which has a greater length than the spinning section and is narrower in width.

5. A process according to claim 4, characterised in that the bottom of the coagulation bath is provided with at least two openings, and the adjacent edges of adjacent openings are at different levels.

6. A process according to any one of the preceding claims, characterised in that the distance travelled by the threadlike extrudates through the gaseous inert medium is more than 0.5 mm and less than 8 mm.

Patentansprüche

1. Verfahren zur Herstellung von Filamenten aus einer optisch anisotropen Spinnlösung, bei dem die Spinnlösung durch Spinndüsenöffnungen extrudiert wird, die in mindestens einem Spinnabschnitt gruppiert sind, und bei dem die Extrudate durch Inertgas und anschließend durch ein Koagulationsbad hindurchgeleitet werden, dadurch gekennzeichnet, daß der Spinnabschnitt oder die Spinnabschnitte rechteckig ausgebildet sind und daß das Verhältnis der Teilung zur Breite des Spinnabschnitts mehr als 0,15 und weniger als 0,7 beträgt, wobei die Teilung als durchschnittlicher Abstand zwischen den Mittelpunkten benachbarter Spinndüsenöffnungen festgelegt ist, und daß die Breite des Spinnabschnitts weniger als 5 mm ist.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die Spinndüsenöffnungen in mehr als einem Spinnabschnitt gruppiert sind.

3. Verfahren nach Anspruch 2, dadurch gekennzeichnet, daß die Spinnabschnitte mit gleichem Abstand über einen Kreis verteilt sind und daß die Längserstreckung eines jeden Spinnabschnitts mit einem Radius zusammenfällt.

4. Verfahren nach Anspruch 2 oder 3, dadurch gekennzeichnet, daß der Boden des Koagulationsbades für jeden Spinnabschnitt mit einer rechteckigen Öffnung ausgestattet ist, die eine größere Länge als der Spinnabschnitt aufweist und die enger in der Breite ist.

5. Verfahren nach Anspruch 4, dadurch gekennzeichnet, daß der Boden des Koagulationsbades mit mindestens zwei Öffnungen ausgestattet ist und daß benachbarte Kanten von benachbarten Öffnungen sich auf unterschiedlichen Niveaus befinden.

6. Verfahren nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Abstand, der von den fadenartigen Extrudaten durch das gasförmige Edelgasmedium zurückgelegt wird, mehr als 0,5 mm und weniger als 8 mm beträgt.

Revendications

1. Procédé de fabrication de filaments à partir d'une solution à filer optiquement anisotrope, dans lequel la solution à filer est extrudée à travers des orifices de filage groupés dans au moins une section de filage et les extrudats passent successivement à travers un gaz inerte et dans un bain de coagulation, caractérisé en ce que la ou les sections de filage sont rectangulaires, et en ce que le rapport du pas à la largeur de la section de filage est supérieur à 0,15 et inférieur à 0,7, le pas étant défini comme étant la distance moyenne entre les centres des orifices de filage d'orifices de filage adjacents, et la largeur de la section de filage est inférieure à 5 mm.

2. Procédé selon la revendication 1, caractérisé en ce que les orifices de filage sont groupés dans plus d'une section de filage.

3. Procédé selon la revendication 2, caractérisé en ce que les sections de filage sont réparties à égale distance sur un cercle, et la direction longitudinale de chacune des sections de filage coïncide avec un rayon.

4. Procédé selon la revendication 2 ou 3, caractérisé en ce que le fond du bain de coagulation est muni d'une section de filage ayant une ouverture rectangulaire qui a une longueur supérieure à la section de filage et qui a une largeur plus étroite.

5. Procédé selon la revendication 4, caractérisé en ce que le fond du bain de coagulation est muni d'au moins deux ouvertures, et les bords adjacents des ouvertures adjacentes sont à des niveaux différents.

6. Procédé selon l'une quelconque des revendications précédentes, caractérisé en ce que la distance parcourue par les extrudats en brin à travers le milieu gazeux inerte est supérieure à 0,5 mm et inférieure à 8 mm.

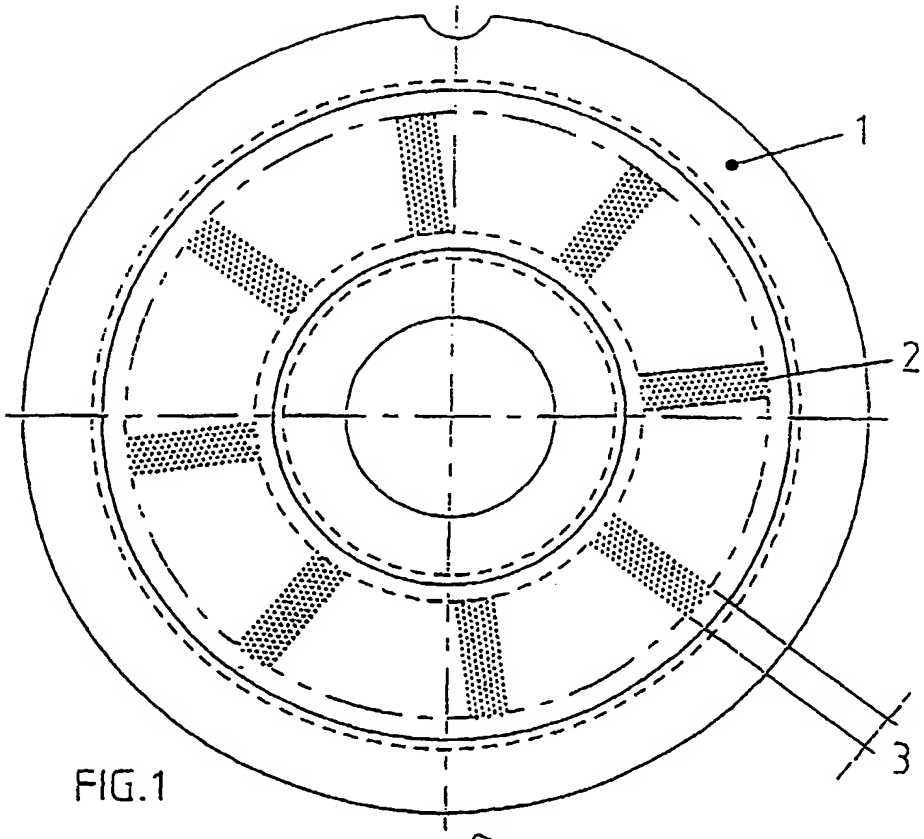

FIG.1

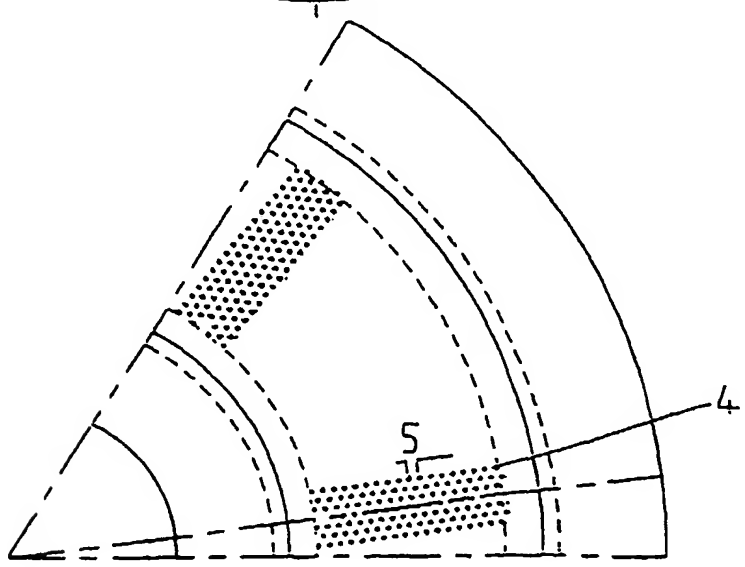

FIG.2

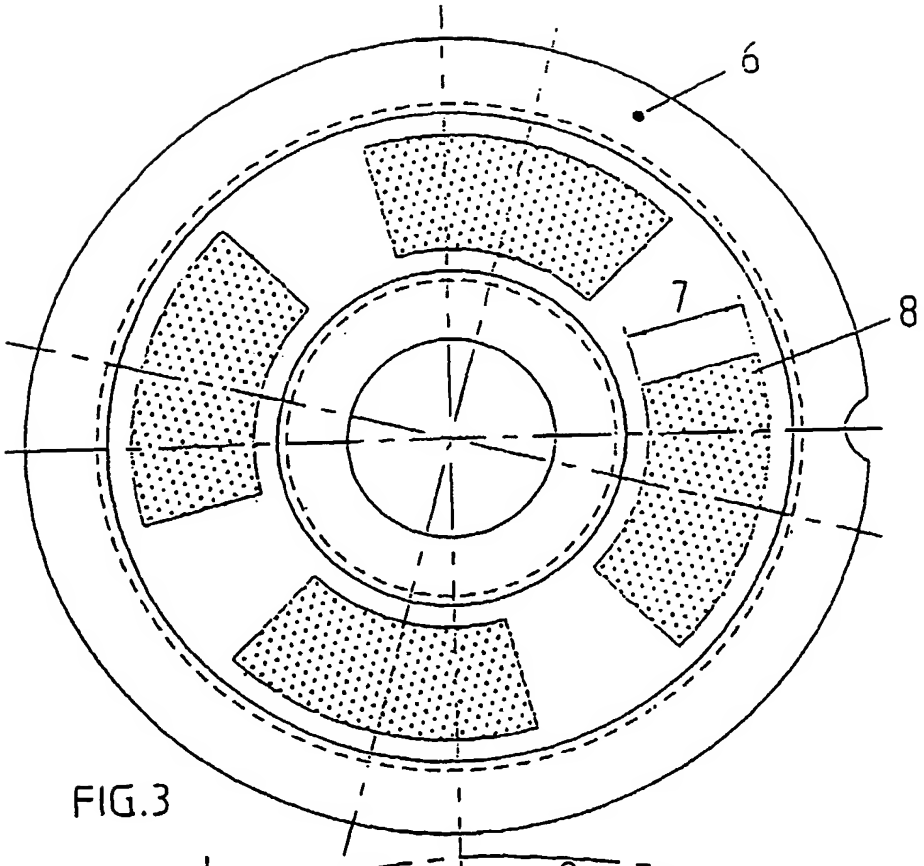

FIG.3

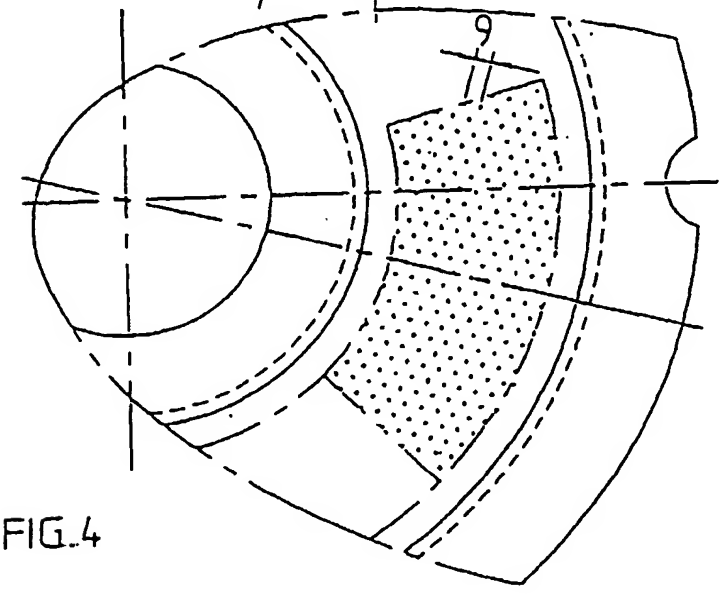

FIG.4

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(54) METHOD FOR MANUFACTURING FILAMENTS FROM AN OPTICALLY ANISOTROPIC SPINNING SOLUTION AND AIR GAP SPINNING DEVICE

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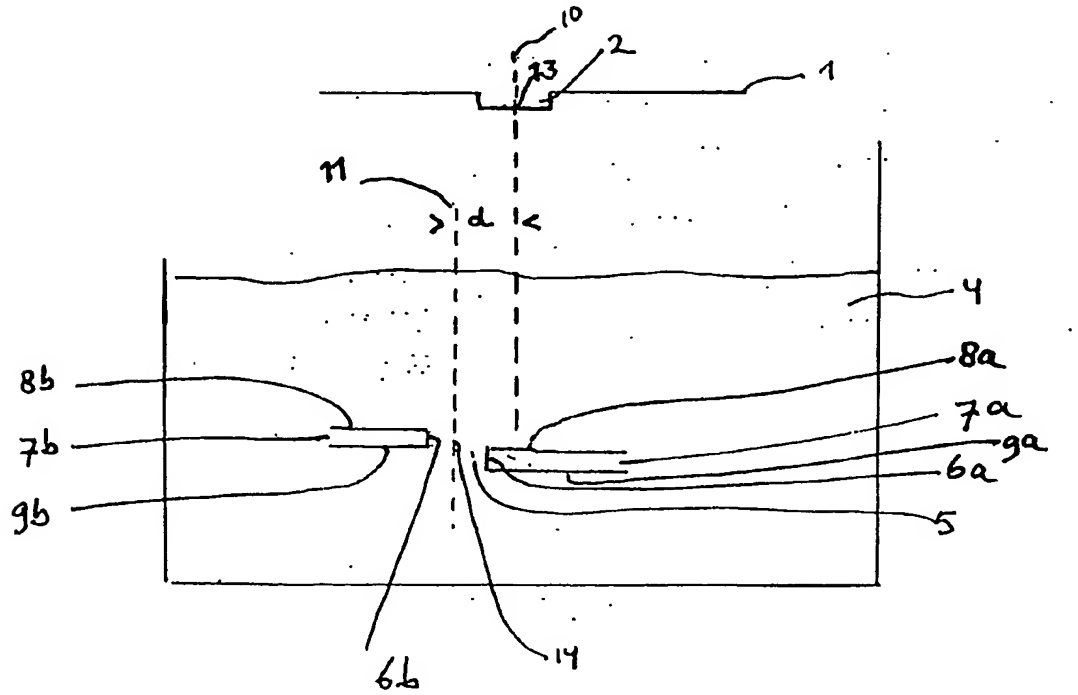
(52) U.S. Cl. 264/165

(57) ABSTRACT

The invention pertains to a method for manufacturing filaments from an optically anisotropic spinning solution in which the spinning solution is extruded through a spinneret including a spinning field with a plurality of spinning orifices into a coagulation bath through a slot or diaphragm, the edges thereof being formed by plates with upper and lower sides. The upper sides of the plates are defined as the sides having the shortest distance to the spinning field, wherein the line through the center of the spinning field and perpendicular to the upper sides is located a distance (d) from a parallel line through the center of the slot or diaphragm. The projection of the slot or diaphragm has about the same size and shape as the projection of the spinning field. The plane of the upper side of one plate has a shorter distance to the center of the spinning field than the plane of the upper side of the other plate, and the line has a smaller distance to the edge of plate than to edge of plate. Furthermore, the invention pertains to an air gap spinning device for performing the method.



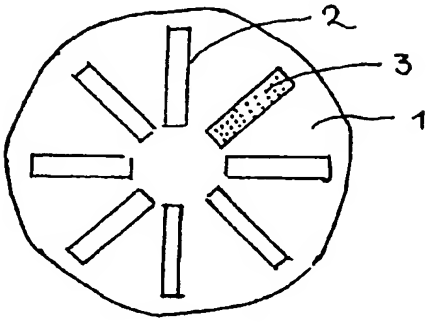


Fig. 1

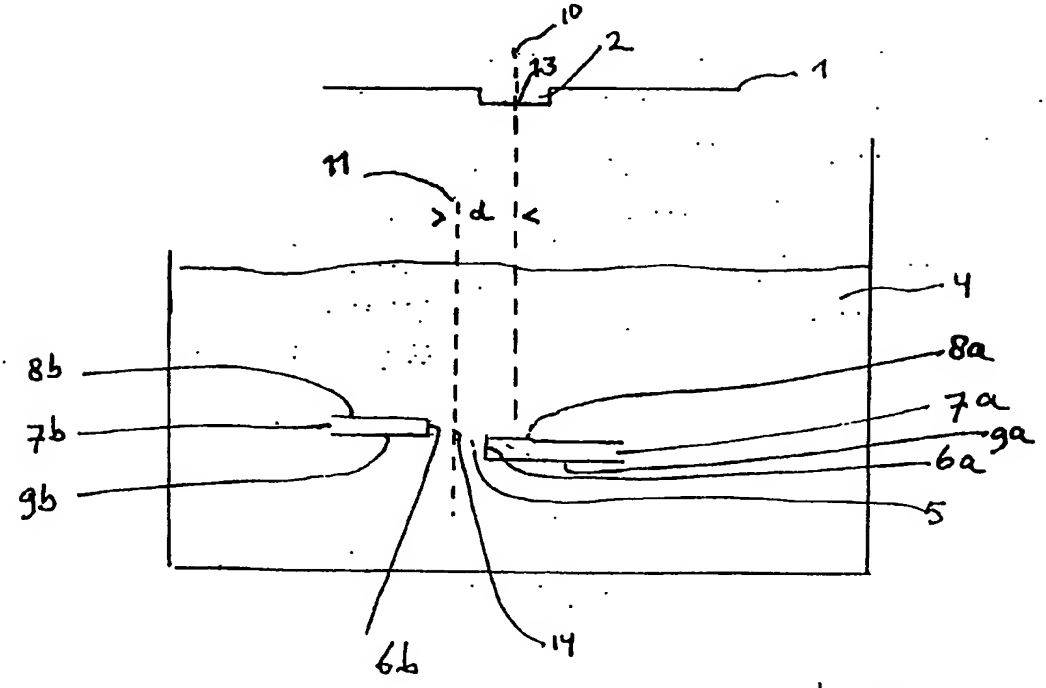


Fig. 2

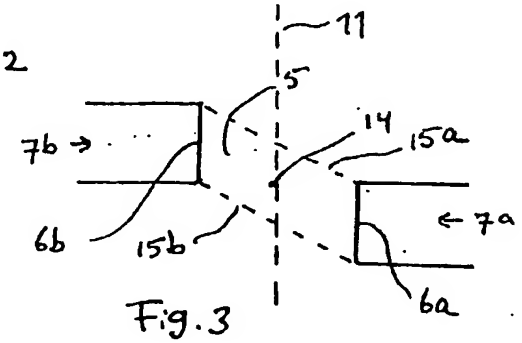


Fig. 3

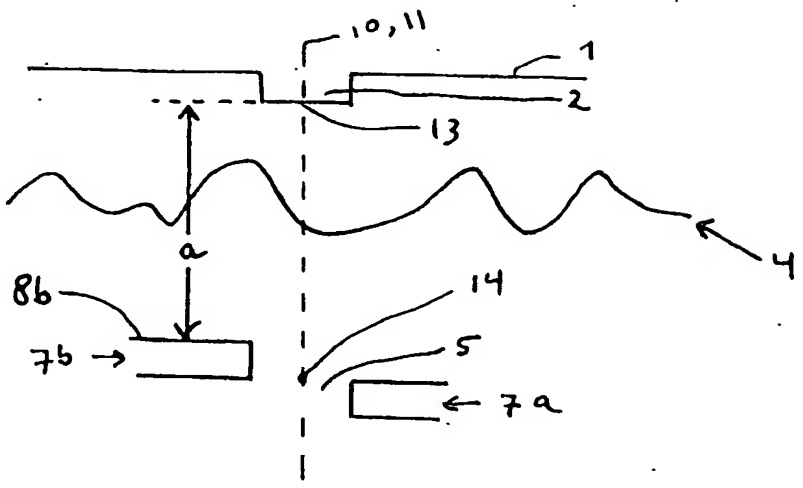


Fig. 4

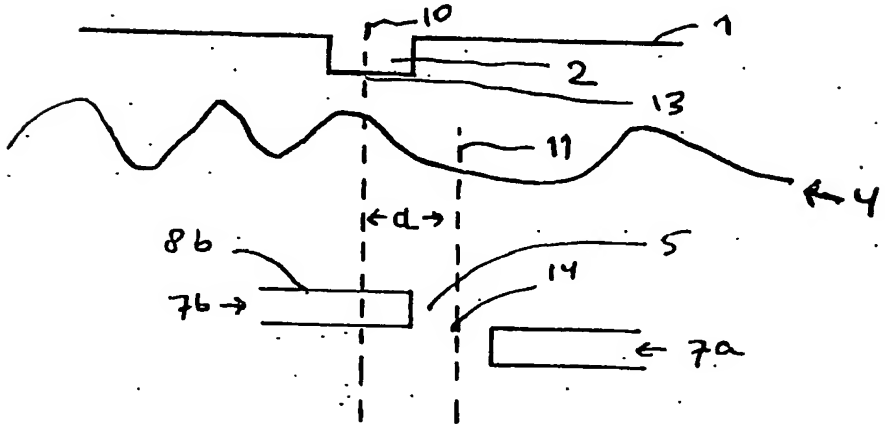


Fig. 5

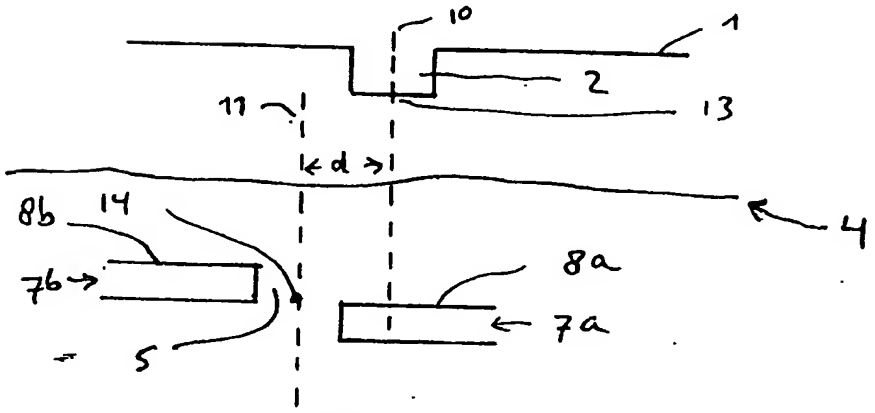


Fig. 6

METHOD FOR MANUFACTURING FILAMENTS FROM AN OPTICALLY ANISOTROPIC SPINNING SOLUTION AND AIR GAP SPINNING DEVICE

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application is the U.S. National stage application of International Application No. PCT/EP03/00471, filed on Jan. 18, 2003.

BACKGROUND OF THE INVENTION

[0002] 1. Field of Invention

[0003] The invention pertains to a method for manufacturing filaments from an optically anisotropic spinning solution in which the spinning solution is extruded through a spinneret comprising a spinning field with a plurality of spinning orifices, into a coagulation bath through a slot or diaphragm, the edges thereof being formed by plates with upper and lower sides, the upper sides of the plates being defined as the sides having the shortest distance to the spinning field, and to an air gap spinning device for performing said method.

[0004] 2. Description of Related Art

[0005] Such a method is known from European Patent No. 0,904,431, wherein it has been disclosed that the motion of the coagulant surface can be reduced when the edges of adjacent openings are at different heights ("on different levels"). In the examples of said patent specification, filaments of good strength are made. This method, however, suffers from the disadvantage that the coagulation bath during the spinning procedure is still in continuous movement, which is particularly troublesome when applied on a larger scale. Such movement has a disadvantageous effect on the filaments formed, since the filaments in the coagulation bath will stick together, rendering the end product unsuitable for use in the envisaged high-grade applications (e.g., woven fabrics or composite reinforcement).

[0006] When very small air gaps are employed (say, smaller than 4 mm), there is a risk of the coagulant, which will always display some motion under the influence of the filament bundle (vibrations, small waves, etc.), making contact with the spinneret plate. When this happens, the process may be disturbed to such a degree, that it will be required to be stopped. Hence, if very small air gaps are to be used, it is of the essence to have the calmest possible coagulation bath surface. It was found that the extent to which the coagulation bath surface is in motion is highly dependent on the geometry of the coagulation bath's bottom. Particularly, when use is made of more than two spinning fields and a corresponding number of discharge openings in the bottom of the coagulation bath, the extent to which there is motion at the coagulant surface can be reduced substantially by introducing the geometry of the present invention. A very simple and effective embodiment that provides a substantial improvement of the known method is the one of the present invention.

SUMMARY OF THE INVENTION

[0007] An object of the present invention is to provide a process enabling the high-speed spinning (>300 m/min) of a plurality of filaments having good to very good physical properties, the process conditions being such that commercial production is possible without having disturbing effects of the coagulation bath surface. This object is attained by adapting the process of the state of the art as indicated above in such a manner that the positions of the spinning field and the slot or diaphragm are such that a line through the center of the spinning field and perpendicular to the upper sides of the plates is put at a distance (d) to a parallel line through the center of the slot or diaphragm, the projection of which has about the same size and shape as the projection of the spinning field, and wherein the plane of the upper side of one plate has a shorter distance to the center of the spinning field than the plane of the upper side of the other plate, and the line through the center of the spinning field has a smaller distance to the edge of the plate with the upper side having the largest distance to the center of the spinning field than to edge of the other plate.

[0008] The edges of the slot or diaphragm are formed by at least two plates, the upper side of one plate having a shorter distance to the spinning field than the upper side of the other plate. The line through the center of the spinning field and perpendicular to the upper sides of the plates has a smaller distance to the edge of the plate with the upper side having the largest distance to the spinning field, than to edge of the other plate. The distance of the upper side of a plate to the spinning field can be defined as the shortest distance of the center of the spinning field to the plane of the upper side of the plate.

[0009] Surprisingly, it was found that this process makes it possible to manufacture filaments having good physical properties at a small pitch (and hence a large number of filaments per unit of area) at a comparatively high acid concentration in the coagulation bath, resulting in an economical process with a small waste stream. As can be seen from the example, the number of stickings occurring during the process (from filaments making contact before there has been sufficient coagulation of the outer shell) is low. No substantial motion occurred in the coagulation bath. A possible explanation of this phenomenon is given below.

[0010] At the edges of the discharge openings, the liquid, which is entrained by the outgoing filament bundle is stopped or scraped off. Because of inertia, the liquid retains (part of) its speed and flows parallel to the bottom in the direction of the adjacent discharge opening. However, coagulant flow also approaches from the direction of this adjacent discharge opening, resulting in the collision of streams flowing in opposite directions. The liquid is pushed up as a result, and the coagulation bath surface rises above this stagnation point. Obviously, the damming up of the coagulant constitutes a significant restriction when selecting the air gap; after all, the coagulant has to be prevented from making contact with the spinneret plate.

[0011] When the aforementioned streams come together at different levels, the disclosed damming up does not arise. On the contrary, because the speed of one of the streams (i.e., the one flowing from the lowest edge) already has a component going in the direction of the liquid surface, there is extinction and the liquid surface remains calm.

[0012] When the coagulation bath has a depth of more than 10 mm and less than 20 mm (preferably less than 15 mm), on the one hand the filaments encounter only slight resistance in the bath and the use of coagulant is low, and on

the other hand the residence time in the coagulation bath is long enough to achieve the required coagulation.

[0013] The process according to the invention makes it possible to use a comparatively compact spinning apparatus or to equip existing spinning apparatus with spinneret plates with a higher number of spinning orifices. For instance, the production of 1000 to 3000 filaments per spinning position is possible.

[0014] The favorable results are probably attributable to the low resistance experienced by the coagulant as it flows to the core of the filament bundle (alternatively, this may be referred to as high filament bundle permeability). The resistance depends on the route to be traveled, i.e., half of the width of the filament bundle, and the space between the various filaments (the pitch).

[0015] Preferably, the spinning orifices are grouped in more than one spinning field. The separate sections can then be positioned vis-à-vis one another such as to ensure the least possible hindrance of the coagulant's approaching flow and the fullest possible avoidance of disturbing the coagulation bath.

[0016] Also, the separate spinning fields preferably are positioned such that the maximum space between the outermost filaments is relatively small at the moment of extrusion from the spinning orifices of the different spinning fields, so that the convergence to, say, a guide, may be low.

[0017] One highly effective way of positioning the spinning fields takes the form of the spinning fields being distributed equidistantly over a circle, with the longitudinal direction of each of the spinning fields coinciding with a radius. Such positioning hinders the approaching flow of the coagulant hardly (if at all) and gives a low convergence for each of the filament bundles. The spinning fields may have any desirable shape, but in many instances rectangular spinning fields are preferred.

[0018] To further reduce convergence in the filament bundle or filament bundles it is preferred to provide the bottom of the coagulation bath per spinning field with an opening, the projection of which preferably has a similar shape and is somewhat narrower in width than the projection of the spinning field. Furthermore, if the opening has a somewhat greater length than the spinning field, it facilitates the in-spinning process. In that case, neither the length nor the width of the opening in the bottom of the coagulation bath will give rise to substantial filament bundle convergence, and the filaments are prevented from being pressed together or suffering damage from scraping along the edge of the slot or diaphragm. In general the difference of the length and the width with regard to the spinning field should be moderate. Such difference is preferably not more than 60% of the length and not more than 100% of the width of the spinning field, more preferably not more than 35% and 55% for the length and the width, respectively.

[0019] The physical properties of the filaments obtained by the process according to the invention can be enhanced still further by selecting a range for the distance traveled by the threadlike extrudates through the gaseous inert medium (the air gap) of more than 0.5 mm and less than 16 mm.

[0020] Within the framework of the invention the term pitch is used to indicate the average distance between the spinning orifice centers of adjacent spinning orifices.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] The invention will be further illustrated below with reference to an example and figures, without being limited by this example.

[0022] **FIG. 1** shows a bottom view of a spinneret according to the invention provided with eight rectangular spinning fields.

[0023] **FIG. 2** shows a cross sectional view of a spinning device according to the invention.

[0024] **FIG. 3** shows a detail of the diaphragm of the spinning device of **FIG. 2**.

[0025] **FIG. 4-6** show the effect on the occurrence of impoundments in a coagulation bath according to the invention and in reference baths not according to the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0026] In **FIG. 1**, a spinneret **1** with eight rectangular spinning fields **2** is shown. Each spinning field **2** contains a plurality of spinning orifices **3** (only depicted in one of the spinning fields).

[0027] In **FIG. 2**, a device according to the invention is shown to which the method of the invention can be explained. The optically anisotropic spinning solution is extruded through a spinneret **1** comprising spinning fields **2** with a plurality of spinning orifices **3**, into a coagulation bath **4** through a slot or diaphragm **5**, edges *6a,6b* thereof being formed by plates *7a,7b* with upper sides *8a,8b* and lower sides *9a,9b*, the upper sides *8a,8b* of the plates *7a,7b* being defined as the sides having the shortest distance to the spinning field **2**. A line **10** through the center **13** of the spinning field **2** and perpendicular to the upper sides *8a,8b* is put at a distance d to a parallel line **11** through the center **14** of the slot or diaphragm **5**. The center **14** is defined as the center of the area that is between and limited by the edges *6a* and *6b* and the line **15***a* being the line between the upper corners of edges *6a* and *6b*, and line **15***b* being the line between the lower corners of edges *6a* and *6b*, which area is the slot or diaphragm **5**. In **FIG. 3**, the cross section of this area and the center **14** are depicted.

[0028] The distance of a plate *7a,7b* to the spinning field **2** is defined as the shortest distance of the plane of the upper side of the plates *7a,7b* and a perpendicular plane through the center **13** of the spinning field **2**. In **FIG. 4**, the distance "a" between perpendicular plane through the center **13** of a convex-shaped spinning field **2** and the upper side *8b* of plate *7b* is depicted.

[0029] In another embodiment (not shown), one of the plates is thicker than the other plate. When the lower sides of these plates are brought at the same or about the same height, the upper sides of the plates will have different distances to center **13** of the spinning field **2**. In all embodiments, each of the spinning fields **2** is in combination with a slot or diaphragm **5**. One slot or diaphragm **5** cannot be in contact (through the spinning fibers) with more than one spinning field **2**.

[0030] The thickness of each of the plates *7a,7b* is preferably independently chosen to be between 0.5 and 5 mm.

[0031] It is preferred that the air gap spinning device of the invention has a shorter distance of plate *7b* to the spinning field **2** than of the other plate *7a* to said spinning field **2**, and that line **10** has a smaller distance to edge *6a* of plate *7a* than to edge *6b* of the other plate *7b*. The distance d thereby is preferably 0.4 to 50 mm, more preferably 1 to 2 mm.

[0032] It was found to be particularly useful to have plates *7a,7b* with a thickness that is about the same as the distance d between the line **10** and the line **11**.

[0033] Particularly good results are obtained when (the projection of) the slot or diaphragm **5** has about the same size and shape as that of the spinning field **2**. In practice, the slot or diaphragm **5** has the same shape, but is preferably slightly smaller than the spinning field **2**. When, furthermore, the slot or diaphragm **5** is slightly longer than the spinning field, in spinning is facilitated. The spinning device is preferably closed with a covering plate just above the slot or diaphragm **5** (not shown).

EXAMPLE

[0034] In an analogous manner to the procedure described in Example 6 of U.S. Pat. No. 4,308,374, poly(para-phenylene terephthalamide) was prepared using a mixture of N-methyl pyrrolidone and calcium chloride. After neutralization, washing and drying, a polymer having an inherent viscosity of 5.4 was obtained.

[0035] The polymer was dissolved in sulfuric acid of 99.8% concentration in the manner described in Example 3 of U.S. Pat. No. 4,320,081. The thus prepared spinning solution had a polymer concentration of 19.4%.

[0036] The spinning solution was spun using different spinneret/diaphragm embodiments (see **FIGS. 4-6**).

[0037] A circular spinneret **1** according to the spinneret disclosed in European Pat. No. 0,904,431, having an outer diameter of 90 mm was provided with eight rectangular spinning fields **2** (2.65 mm width and 18.4 mm length) each having **250** spinning orifices **3**, and being distributed equidistantly over the spinneret **1**. The spinning orifices **3** had a diameter of 65 μm and a distance of one to the other (pitch) of 0.5 mm (the ratio of the pitch to the width of the spinning field 2 thus was 0.5/2.65=0.19).

[0038] The spinning solution was spun through an air gap of 6 mm length into a coagulation bath. The coagulant was made up of water having a sulfuric acid concentration of 2% and a temperature of 13° C. The spinning speed was 300 m/min and the draw ratio was 6.8 to a total fiber bundle of 3360 dtex. The physical properties were determined in accordance with ASTM D885.

[0039] At 10 mm below the surface of the coagulation bath there were provided eight diaphragms (rectangular 1.26 mm×24 mm) each of which can be positioned slightly shifted beneath a spinning field. The diaphragm plates *7a,7b* could be shifted both at the same time in the same direction perpendicular to the filaments, by which the positioning was possible of the diaphragms **5** with respect to the spinning fields **2**. The shift distance could be read from a grade mark. By this method, line **10** through the center **13** of the spinning field **2** and perpendicular to upper sides *8a,8b* of the plates *7a,7b* could set at a distance d to a parallel line **11** through the center **14** of the diaphragm **5**, varying from −10 to +10 mm (including 0 mm when lines 10 and 11 coincide with each other).

[0040] When d was set at 0 mm, spinning was practically impossible because of the severe coagulation bath movements with impoundments of the bath as high as 5 mm. This is shown in **FIG. 4**, a comparative example.

[0041] A similar occurrence of movements resulting in impoundments up to 4 mm height is shown in **FIG. 5** wherein the spinning fields **2** are shifted with distance d minus 1.5 mm in the direction of plates *7b* with the upper sides *8b* having the shortest distance to the centers **13** of the spinning fields with regard to the upper sides *8a*, a comparative example. Spinning was very difficult in this embodiment and it was necessary to lengthen the air gap to unacceptable dimensions.

[0042] Furthermore, a substantial increase of the degree of sticking of the filaments was found (up to 25% of the filaments were subject to sticking).

[0043] In **FIG. 6**, a situation is shown wherein the spinning fields **2** are shifted with distance d plus 1.5 mm in the direction of plates *7a* with the upper sides *8a* having the largest distance to the centers **13** of the spinning fields with regard to the upper sides *8b*. No disturbing movements of the coagulation bath occurred and spinning could easily be performed. Yam was made with this embodiment having a bundle linear density of 3420 dtex, yarn tenacity 2225 mN/tex and <1% degree of sticking.

[0044] It was found that optimum results were obtained for 0.5 mm<d<2 mm.

1. A method for manufacturing filaments from an optically anisotropic spinning solution comprising extruding the spinning solution through a spinneret comprising a spinning field with a plurality of spinning orifices into a coagulation bath through a slot or diaphragm, the edges thereof being formed by plates with upper sides and lower sides, the upper sides of the plates being defined as having a shortest distance to the spinning field, wherein a line through a center of the spinning field and perpendicular to the upper sides is located at distance (d) from a parallel line through a center of the slot or diaphragms, wherein a projection of the slot or diaphragm has about a same size and shape as a projection of the spinning field, and wherein a plane of an upper side of one of the plates has a shorter distance to the centere of the spinning field than a plane of an upper side of the other of the plates, and the line through the center of the spinning field has a smaller distance to the edge of the other of the plates than to an edge of the one of the plates.

2. An air gap spinning device comprising a spinneret comprising a spinning field with a plurality of spinning orifices, and a slot or diaphragm with edges formed by plates with upper sides and lower sides, the upper sides of the plates being defined as having a shortest distance to the spinning field, wherein a line through a center of the spinning field and perpendicular to the upper sides has a distance (d) from a parallel line through a center of the slot or diaphragm, wherein a projection of the slot or diaphragm has about a same size and shape as a projection of the spinning field, and wherein a plane of an upper side of one of the plates has a shorter distance to the center of the spinning field than a plane of an upper side of the other of

the plates, and a line has a smaller distance to an edge of an other plate than to an edge of the one plate.

3. The air gap spinning device of claim 2, wherein the thickness of each of the plates is independently about 0.5 to 5 mm.

4. The air gap spinning device of claim 2, wherein the distance (d) between the line through the center of the spinning field and the parallel line through the center of the slot or diaphragm is about 0.4 to 50 mm.

5. The air gap spinning device of claim 2, wherein the distance (d) between the line through the center of the spinning field and the parallel line through the center of the slot or diaphragm is about 1 to 2 mm.

6. The air gap spinning device of claim 2, wherein the thickness of each of the plates is about the same as the distance (d) between the line through the center of the spinning field and the parallel line through the center of the slot or diaphragm.

7. The air gap spinning device of claim 2, wherein the projection of the slot or diaphragm has a greater length than the projection of the spinning field and is narrower in width.

* * * * *

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Johannes Jacobus MEERMAN et al.	Group Art Unit: 1732
Application No.: 10/500,713	Examiner: J. WOLLSCHLAGER
Filed: July 6, 2004	Docket No.: 119567

For: METHOD FOR MANUFACTURING FILAMENTS FROM AN OPTICALLY ANISOTROPIC SPINNING SOLUTION AND AIR GAP SPINNING DEVICE

DECLARATION UNDER 37 C.F.R. §1.132

I, Prof. Dr. Stephen J. Picken, a citizen of The Netherlands, hereby declare and state:

1. I have a degree in Applied Sciences which was conferred upon me by University of Utrecht in Utrecht, The Netherlands in 1990 (cum-laude, title: Orientational Order in Aramid Solutions).

2. I have been employed by the Delft University of Technology, the Netherlands, since January 1, 2000 and I have had a total of 23 years of work and research experience in the field of liquid crystal polymers for use in fibre spinning processes, as well as a range of other topics related to polymer science and engineering.

3. I am a member of ACS, KNCV (Royal Dutch Chemical Society), NNV (Dutch Physics Society), Bataafsch Genootschap der Proefondervindelyke Wysbegeerte (Scientific Society Rotterdam).

4. My publications include the following works in this field: "Clearing temperatures of aramid solutions in sulfuric acid." S.J. Picken, Macromolecules 1989, 22, 1766-71; "Phase Transitions and Rheology of Aramid Solutions." S.J. Picken, Liquid Crystals 1989, 5, 1635-43; "Orientational order in aramid solutions determined by diamagnetic

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5. I am not a named inventor in the above-captioned patent application.

6. I am an independent advisor of the assignee of the above-identified patent application. I am compensated for my work in connection with this Declaration.

7. I have read and understood US patent application 10/500,713 and reviewed new Figure 2 as filed at the U.S. Patent and Trademark Office on April 30, 2007.

8. The following technical discussion is being provided to demonstrate that the original specification supports the amendment to Figure 2, as filed on April 30, 2007.

Having read the specification of this application, including paragraphs [0001], [0003] and [0015], and based on my knowledge of one of ordinary skill in the art, I understand that Figure 2 of the original application is incorrect. I understand the specification to clearly describe that the slot or diaphragm is positioned at the bottom of the coagulation bath. I understand the specification to clearly describe a configuration as shown in the attached revised Figure 2. This is also apparent from the text of the original patent application paragraphs [0010] and [0011] and indeed from the subsequent figures 4-6.

From the description of the application, the only logical location for the both slot/diaphragm and the discharge opening, would be at the bottom of the coagulation bath. Locating the slot/diaphragm or the discharge opening in the coagulation bath elsewhere could lead to damage to the filaments as the filaments will be scraped along the edges of the slot or diaphragm or will accumulate at the bottom of the coagulation bath and become pressed together. See, for example, the original patent application at paragraph [0015]. This type of damage is specifically avoided by having the slot/diaphragm and the discharge opening located at the bottom of the coagulation bath, because in this configuration the filaments can be extracted from the coagulation bath without damage and can be easily spooled.

Additionally, it is also logical that the opening of the slot or diaphragm corresponds to the discharge opening. Paragraph [0001] of the originally filed application describes the claimed method for manufacturing filaments. Paragraph [0001] recites that the filament is extruded through a spinneret and into a coagulation bath. The filament then travels through a slot or opening, the edges thereof being formed by plates having upper and lower sides. Paragraph [0001] does not state that the filament then continues to travel through the

coagulation bath and through a separate discharge opening. Thus, the discharge opening corresponds to the opening of the slot or diaphragm. Furthermore, paragraph [0001] recites that the filament passes through the edges of the slot or diaphragm. Paragraph [0001] does not state that the filament also passes through the edges of a separate discharge opening. Thus, the discharge opening must correspond to the edges of the slot or diaphragm. Since the discharge opening must be located at the bottom of the coagulation bath (application, paragraph [0003]), it follows that the slot or diaphragm must also be located at the bottom of the coagulation bath. Indeed in paragraph [0011] it is mentioned that the design of coagulation bath is such that the fluid surface remains calm due to the balance of the various fluid flow components which I understand to be due to the location and size of the slot or diaphragm at the point of discharge.

9. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 24th April 2008, Delft

Dr. Stephen J. Picken

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,713	07/06/2004	Johannes J. Meerman	119567	7197

25944 7590 07/15/2008

OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

EXAMINER	
WOLLSCHLAGER, JEFFREY MICHAEL	
ART UNIT	PAPER NUMBER
1791	
MAIL DATE	DELIVERY MODE
07/15/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/500,713	MEERMAN ET AL.	
	Examiner	Art Unit	
	JEFFREY WOLLSCHLAGER	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 21, 2008 has been entered.

Response to Amendment

Applicant's amendment to the claims filed May 21, 2008 has been entered. Claims 1, 2 and 7 are currently amended. Claims 1-7 are pending and under examination.

Drawings

The amendment to the drawings filed April 30, 2007 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: Figure 2 has been modified to show the plates and the slot or diaphragm at the bottom of the coagulation bath. This objection may be overcome by pointing to the location in the original disclosure where support for this amendment may be found. Otherwise, applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Regarding claims 1 and 2, the limitation "wherein the slot or diaphragm is positioned at the bottom of the coagulation bath", as shown in replacement Figure 2 filed April 30, 2007, does not appear to be supported by the original disclosure as is explained in more detail below in the response to arguments. Claims 3-7 are rejected as dependent claims.

Response to Arguments

Applicant's arguments and the 37 C.F.R. 1.132 declaration filed May 21, 2008 have been fully considered, but they are not persuasive.

Regarding the objection to the new matter shown in replacement Figure 2 and the 35 USC 112, first paragraph rejection regarding the limitation "wherein the slot or diaphragm is positioned at the bottom of the coagulation bath" applicant argues and the declaration states that paragraphs [0001], [0003] and [0015] of the original disclosure (which correspond to paragraphs [0003], [0006], and [0018] of the instant disclosure published as US 2005/0179162 – all citations to the instant disclosure by the examiner are to the US Patent Application Publication) provide the required support. Applicant's arguments and the declaration state that the slot or diaphragm must be at the bottom of the coagulation tank as this is the only logical

location and that if the slot or diaphragm is not at the bottom of the tank the filaments will suffer damage. Finally, the declaration and the arguments point specifically to paragraph [0001] of the original disclosure (paragraph [0003] of US 2005/0179162) and conclude that the discharge opening corresponds to the slot or diaphragm. These arguments are not persuasive.

The examiner submits that a review of these paragraphs as well as the rest of the specification does not demonstrate the slot or diaphragm is expressly, implicitly, or inherently at the bottom of the coagulation bath or that the slot or diaphragm corresponds to the discharge opening. For example, paragraph [0012] of US 2005/0179162 teaches the coagulation bath has a depth of "more than 10 mm and less than 20 mm" while paragraph [0039] exemplifies eight diaphragms located "at 10 mm below the surface of the coagulation bath". As such, the examiner submits this alone teaches the diaphragm is not at the bottom of the coagulation bath (i.e. 10 mm vs. more than 10 mm) and that the configuration claimed and set forth in revised Figure 2 is not the only logical and necessary location of the slot or diaphragm. Further, paragraph [0029] recites that "[i]n all embodiments, each of the spinning fields 2 is in combination with a slot or diaphragm 5." while paragraph [0018] recites that "it is preferred to provide the bottom of the coagulation bath per spinning field with an opening." Accordingly, it follows that since each spinning field must be in combination with a slot or diaphragm while it is only preferred that each spinning field is provided with a discharge opening at the bottom of the coagulation bath that the slot or diaphragm does not correspond to the discharge opening as argued. Applicant's arguments and the declaration also suggest that since paragraph [0001] (paragraph [0003] of US 2005/0179162) does not recite that the filament then continues to travel through the coagulation bath and through a separate discharge opening that the discharge opening corresponds to the opening of the slot or diaphragm. This is not persuasive for the same reason set forth above comparing paragraphs [0029] and [0018]. Further, the

examiner submits that such an argued connection between the slot or diaphragm and the discharge opening only appears feasible after viewing revised Figure 2 (which the examiner maintains also contains new matter) and that such a connection is not expressed, implied or inherent in the original disclosure.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEFFREY WOLLSCHLAGER whose telephone number is (571)272-8937. The examiner can normally be reached on Monday - Thursday 6:45 - 4:15, alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. W./
Examiner, Art Unit 1791

July 14, 2008

/Monica A Huson/
Primary Examiner, Art Unit 1791

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Johannes Jacobus MEERMAN et al. Group Art Unit: 1732

Application No.: 10/500,713 Examiner: J. WOLLSCHLAGER

Filed: July 6, 2004 Docket No.: 119567

For: METHOD FOR MANUFACTURING FILAMENTS FROM AN OPTICALLY ANISOTROPIC SPINNING SOLUTION AND AIR GAP SPINNING DEVICE

DECLARATION UNDER 37 C.F.R. §1.132

I, Prof. Dr. Stephen J. Picken, a citizen of The Netherlands, hereby declare and state:

1. I have a degree in Applied Sciences, which was conferred upon me by University of Utrecht in Utrecht, The Netherlands in 1990 (cum-laude, title: Orientational Order in Aramid Solutions).

2. I have been employed by the Delft University of Technology, the Netherlands, since January 1, 2000 and I have had a total of 23 years of work and research experience in the field of liquid crystal polymers for use in fibre spinning processes, as well as a range of other topics related to polymer science and engineering.

3. I am a member of ACS, KNCV (Royal Dutch Chemical Society), NNV (Dutch Physics Society), Bataafsch Genootschap der Proefondervindelyke Wysbegeerte (Scientific Society Rotterdam).

4. My publications include the following works in this field: "Clearing temperatures of aramid solutions in sulfuric acid." S.J. Picken, Macromolecules 1989, 22, 1766-71; "Phase Transitions and Rheology of Aramid Solutions." S.J. Picken, Liquid Crystals 1989, 5, 1635-43; "Orientational order in aramid solutions determined by diamagnetic

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5. I am not a named inventor in the above-captioned patent application.

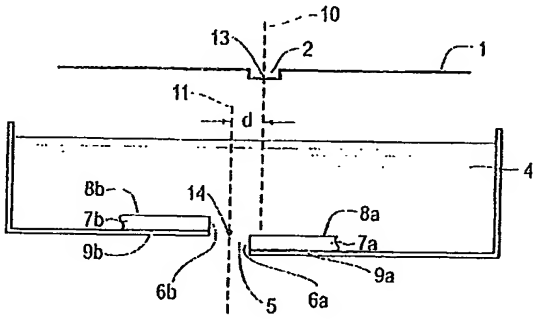
6. I am an independent advisor of the assignee of the above-identified patent application. I am compensated for my work in connection with this Declaration.

7. I have read and understood US patent application 10/500,713 and reviewed new Figure 2 as filed at the U.S. Patent and Trademark Office on April 30, 2007.

8. The following technical discussion is being provided to further demonstrate that the original specification supports the amendment to Figure 2, as filed on April 30, 2007.

Having read the specification of this application, including paragraphs [0012], [0018], [0029], and [0039], and based on my knowledge of one of ordinary skill in the art, I understand that Figure 2 of the original application is incorrect. I understand the specification to describe that the slot or diaphragm is positioned at the bottom of the coagulation bath. I understand the specification to describe a configuration as shown in the following revised Figure 2. This configuration is also supported by the text of the original patent application at paragraphs [0018] and [0029].

Revised Figure 2:



Regarding the combination of paragraphs [0012] and [0039], it is clear that paragraph [0012] is discussing only one of several factors, which are used to determine the optimal depth of the coagulation bath. Paragraph [0012] clearly recites that "when the coagulation bath has a depth of more than 10 mm and less than 20 mm, optimum coagulation of the fiber is obtained." Coagulation is just one of several factors that must be taken into consideration when the optimal depth of the coagulation bath is selected. Other factors include, for example, fluid friction forces, temperature, tension, coagulation speed and bath concentration. For example, at increased coagulation bath depths, the fluid friction forces increase which results in adverse effects on the fibers produced. Once all of the factors are evaluated the

optimal coagulation bath depth may be, for example, at or less than 10 mm, as shown in the specific example of paragraph [0039]. Thus, these paragraphs do not demonstrate that the diaphragm of paragraph [0039] is not located at the bottom of the coagulation bath because the disclosure does not require that the coagulation bath must be greater than 10 mm. In fact, the optimal coagulation bath depth may be selected to be at or less than 10 mm, as discussed above.

I have also reviewed the combination of paragraphs [0018] and [0029]. In paragraph [0018], I have evaluated the statement "it is preferred to provide the bottom of the coagulation bath per spinning field with an opening . . .." In this statement, I have interpreted the first occurrence of the term "preferred" to modify the shape of the openings with regard to the shape of the spinning fields, rather than modifying the presence or absence of the opening, or the location of the opening at the bottom of the coagulation bath. There is no ambiguity in paragraph [0018], because it is impossible to spin a polymer stream to a fiber if the opening is not present at the bottom of the coagulation bath. Additionally, if the diaphragm is not positioned at the bottom of the coagulation bath, then serious turbulence would occur between the diaphragm and the opening in the coagulation bath, which would make transport of the fiber from the diaphragm to the bath opening impossible. Thus, the first "preferred" that appears in paragraph [0018] cannot refer to the presence or absence or the location of the opening, which for technical reason must be present at the bottom of the coagulation bath. Thus, since each spinning field must be paired with one slot or diaphragm (paragraph [0029]), and since each spinning field must have the same or a similar shape as the corresponding opening provided at the bottom of the coagulation bath (paragraph [0018]), it follows that paragraph [0018] unambiguously discloses that the slot or diaphragm is provided at the bottom of the coagulation bath. Thus, in my opinion, new Figure 2 is supported by the disclosure in the specification.

9. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: _____

_____
Dr. Stephen J. Picken

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,713	07/06/2004	Johannes J. Meerman	119567	7197

25944 7590 12/29/2008

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EXAMINER	
WOLLSCHLAGER, JEFFREY MICHAEL	
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FINAL REJECTION/
NOTICE OF APPEAL

DUE DATE
MAR 29 2009

Office Action Summary	Application No.	Applicant(s)	
	10/500,713	MEERMAN ET AL.	
	Examiner	Art Unit	
	JEFFREY WOLLSCHLAGER	1791	

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Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 October 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 April 2007* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's amendment and the rule 1.132 declaration filed October 30, 2008 have been entered. Claims 1-7 are pending and under examination.

Drawings

The amendment to the drawings filed April 30, 2007 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: Figure 2 has been modified to show the plates and the slot or diaphragm at the bottom of the coagulation bath. This objection may be overcome by pointing to the location in the original disclosure where support for this amendment may be found. Otherwise, applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Regarding claims 1 and 2, the limitation "wherein the slot or diaphragm is

positioned at the bottom of the coagulation bath", as shown in replacement Figure 2 filed April 30, 2007, does not appear to be supported by the original disclosure. Claims 3-7 are rejected as dependent claims. This rejection may be overcome by pointing to the location in the original disclosure where support for this limitation may be found.

Response to Arguments

Applicant's arguments and the rule 1.132 declaration filed October 30, 2008 have been fully considered, but they are not persuasive. As an initial matter, the examiner provides the following pertinent citations from MPEP 2163 which provide the basis for the 35 USC 112 written description analysis:

> For the written description requirement, an applicant's specification must reasonably convey to those skilled in the art that the applicant was in possession of the claimed invention as of the date of invention.
>
> The examiner has the initial burden of presenting evidence or reasoning to explain why persons skilled in the art would not recognize in the original disclosure a description of the invention defined by the claims. See Wertheim, 541 F.2d at 263, 191 USPQ at 97 ("[T]he PTO has the initial burden of presenting evidence or reasons why persons skilled in the art would not recognize in the disclosure a description of the invention defined by the claims."). However, when filing an amendment an applicant should show support in the original disclosure for new or amended claims.
>
> To comply with the written description requirement of 35 U.S.C. 112, para. 1, or to be entitled to an earlier priority date or filing date under 35 U.S.C. 119, 120, or 365(c), each claim limitation must be expressly, implicitly, or inherently supported in the originally filed disclosure. When an explicit limitation in a claim "is not present in the written description whose benefit is sought it must be shown that a person of ordinary skill would have understood, at the time the patent application was filed, that the description requires that limitation." Hyatt v. Boone, 146 F.3d 1348, 1353, 47 USPQ2d 1128, 1131 (Fed. Cir. 1998). See also In re Wright, 866 F.2d 422, 425, 9 USPQ2d 1649, 1651 (Fed. Cir. 1989)
>
> "To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be

established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'")

An objective standard for determining compliance with the written description requirement is, "does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed." In re Gosteli, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989). Under Vas- Cath, Inc. v. Mahurkar, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir.1991)

Applicant's arguments and the rule 1.132 declaration initially attempt to explain why the examiner's previous response to arguments in the July 15, 2008 non-final office action does not definitively prove that the slot or diaphragm is not at the bottom of the coagulation bath. This argument is not persuasive. While the examiner understands applicant's remarks and can even agree that applicant's explanation of the citations provided by the examiner could be considered plausible (although not necessarily more plausible than the examiner's original analysis), the examiner notes that the extent of the arguments merely show that the examiner has not established beyond all uncertainty that the slot or diaphragm is not at the bottom of the coagulation bath. However, the examiner submits this argument does not rise to the level of showing that the slot or diaphragm is at the bottom of the coagulation bath. As this is what must be effectively demonstrated to overcome the rejection, the rejection is maintained.

The examiner submits that the original disclosure does not expressly disclose the argued limitation. As such, applicant is relying upon an implicit or inherent disclosure of the limitation. As set forth above, and in previous office actions, the examiner submits that citations have been provided from the original disclosure that imply/suggest the slot or diaphragm is not at the bottom of the coagulation bath. While applicant has provided a response to these citations and has provided additional citations throughout prosecution, these do not suggest the argued limitation to the extent required to demonstrate possession of the claimed invention at the time of filing.

Turning to page 5 of the 1.132 declaration, which summarizes the response to the citations provided by the examiner, it was declared that:

> "Thus, since each spinning field must be paired with one slot or diaphragm (paragraph [0029]), and since each spinning field must have the same or a similar shape as the corresponding opening provided at the bottom of the coagulation bath (paragraph [0018]), it follows that paragraph [0018] unambiguously discloses the slot or diaphragm is provided at the bottom of the coagulation bath. Thus, in my opinion, new Figure 2 is supported by the disclosure in the specification."

For the sake of argument, even if the examiner conceded that each spinning field is paired with a slot or diaphragm and that each spinning field has the same or similar shape as the corresponding opening at the bottom of the coagulation bath, it is unclear to the examiner how these two facts together result in an unambiguous conclusion that the slot or diaphragm is at the bottom of the coagulation bath. It appears to the examiner that such an unambiguous conclusion must have been reached in some combination with the following statement from page 5 of the declaration:

> "...if the diaphragm is not positioned at the bottom of the coagulation bath, then serious turbulence would occur between the diaphragm and the opening in the coagulation bath, which would make transport of the fiber from the diaphragm to the bath opening impossible."

However, the examiner submits there is no evidence/data on the record to support the assertion that if the diaphragm or slot is located anywhere else but the bottom of the coagulation bath it would be impossible to transport the fiber from the diaphragm or slot to the bath opening. Finally, the examiner submits that should such evidence/data be submitted it would likely require further consideration.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEFFREY WOLLSCHLAGER whose telephone number is (571)272-8937. The examiner can normally be reached on Monday - Thursday 6:45 - 4:15, alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. W./
Examiner, Art Unit 1791

December 24, 2008

/Monica A Huson/

Primary Examiner, Art Unit 1791

PATENT APPLICATION

RESPONSE UNDER 37 CFR §1.116
EXPEDITED PROCEDURE
TECHNOLOGY CENTER ART UNIT 1791

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Johannes Jacobus MEERMAN et al. Group Art Unit: 1791

Application No.: 10/500,713 Examiner: J. WOLLSCHLAGER

Filed: July 6, 2004 Docket No.: 119567

For: METHOD FOR MANUFACTURING FILAMENTS FROM AN OPTICALLY ANISOTROPIC SPINNING SOLUTION AND AIR GAP SPINNING DEVICE

REQUEST FOR RECONSIDERATION AFTER FINAL REJECTION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In reply to the December 29, 2008 Office Action, the period for response having been extended by the attached Petition for Extension of Time, reconsideration of the rejection and objection is respectfully requested in light of the following remarks.

REMARKS

Claims 1-7 are pending in this application. The Office Action objects to the drawings filed April 30, 2007; and rejects claims 1-7 under 35 U.S.C. §112, first paragraph. Applicants respectfully traverse the objection and rejection.

I. Objection to the Drawings

The amendment to the drawings filed April 30, 2007, is objected to under 35 U.S.C. 132(a) as allegedly introducing new matter. Applicants respectfully traverse the objection.

Applicants note that two Declarations under 37 C.F.R. 1.132, executed by Dr. Stephen Picken, have been filed discussing this issue. In response to the Declaration filed October 30, 2008, the Office Action admits that "the applicant's explanation of the citations provided by the examiner could be considered plausible." However, the Office Action nonetheless states that "the extent of the arguments merely show that the examiner has not established beyond all certainty that the slot or diaphragm is not at the bottom of the coagulation bath. However, the examiner submits that this argument does not rise to the level of showing that the slot or diaphragm is at the bottom of the coagulation bath." (Emphasis added.)

Although Applicants respectfully disagree with the burden of proof being required by the Office Action, and respectfully submit that the previously filed Declarations show that a person having ordinary skill in the art would necessary understand that the slot or diaphragm is located at the bottom of the coagulation bath, Applicants nonetheless here provide further analysis based on the present specification as originally filed.

First, Figure 2 as originally filed is shown below.

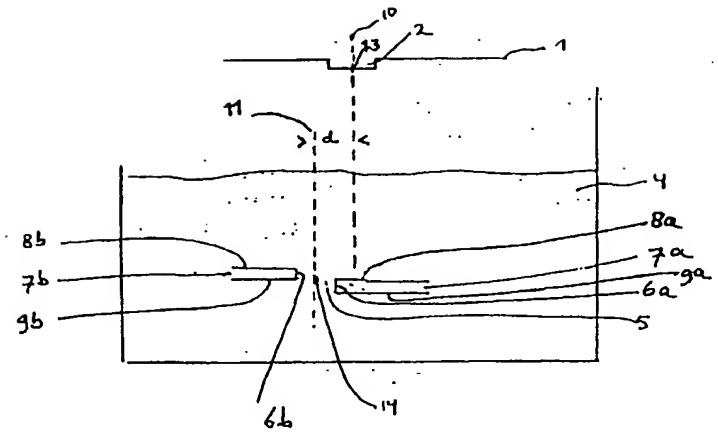


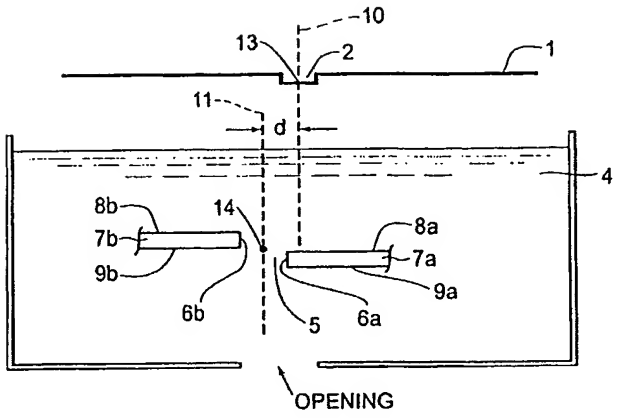
Fig. 2

Original Figure 2

As has been repeatedly discussed, Applicants respectfully submit that the outermost line defining the boundary of the bottom of the bath in original Figure 2 was drawn in error, and this boundary should have been drawn as being contiguous with the bottoms of the slots 7a and 7b. This is the issue at dispute. However, regardless, Applicants note that original Figure 2 *also* did not show the "discharge opening" in the bottom of the bath. Paragraph [0003] of the specification as originally filed clearly discussed the "discharge opening[] in the bottom of the coagulation bath." The Office Action mailed February 4, 2008, agrees that "there must be an opening in the bottom of the coagulation bath shown in the original Figure 2." Office Action mailed February 4, 2008, page 6.

Therefore, regardless of whether *the slot or diaphragm* is located at the bottom of the bath, a *discharge opening* is clearly located at the bottom of the bath. A hypothetical Figure 2, showing the slot or diaphragm as was shown in original Figure 2, but also including a discharge opening at the bottom of the bath, is shown below.

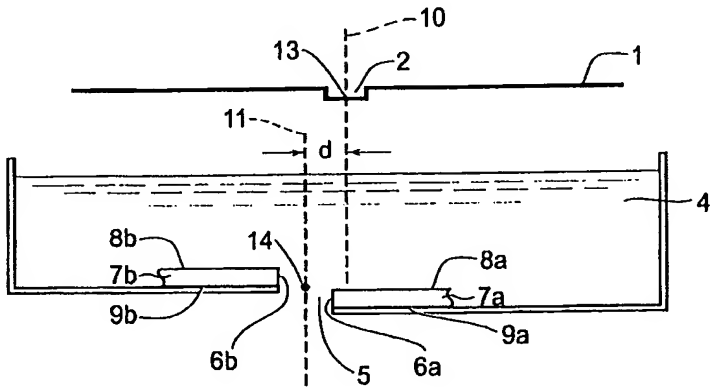
FIG. 2



Hypothetical Figure 2

Applicants strongly stress that this Figure is hypothetical, and is presented only for the purposes of argument herein.

With the above two Figures in mind, Applicants respectfully submit that the issue of whether the slot or diaphragm is located at the bottom of the coagulation bath can be restated as *whether the slot or diaphragm corresponds to (i.e. is the same as) the discharge opening.* As has been previously discussed throughout prosecution, Applicants submit that the discharge opening corresponds to the slot or diaphragm (see Declaration filed April 28, 2008, page 4) such that only one actual opening is present in the bottom of the bath. This is the configuration as shown in amended Figure 2. Amended Figure 2 is shown below.



Amended Figure 2

Applicants note that either "Hypothetical Figure 2" or "Amended Figure 2" *must* be correct, in that the only possible options are that either (1) the slot or diaphragm is located *on* the

discharge opening as in Amended Figure 2, or (2) the slot or diaphragm is located some distance above the discharge opening as in Hypothetical Figure 2.

Applicants have repeatedly argued throughout prosecution that a person having ordinary skill in the art would understand that "Amended Figure 2" is necessarily disclosed by the specification as originally filed. In further support for these arguments, the following four *new* arguments are presented. Applicants respectfully request full and proper consideration of each of the following new arguments.

(1) Paragraph [0003] of the present specification as originally filed states that "the extent to which the coagulation bath surface is in motion is highly dependent on the geometry of the coagulation bath's *bottom*" (emphasis added). Therefore "the extent to which there is motion at the coagulant surface can be reduced substantially by introducing *the geometry of the present invention*" (emphasis added). Applicants respectfully submit that the description of the "slot or diaphragm" throughout the present specification is clearly the "present invention" referenced in paragraph [0003]. See, for example, paragraphs [0004] and [0005] describing the geometry of the slot or diaphragm under "Summary of the Invention." Therefore, the geometry of the "slot or diaphragm" is clearly the "geometry of the coagulation bath's *bottom*" as described in paragraph [0003]. Thus, the slot or diaphragm is located at the bottom of the bath, in accordance with Amended Figure 2.

(2) Paragraph [0007] describes how "at the edges of the *discharge openings*, the liquid, which is entrained by the outgoing filament bundle is stopped or scraped off" (emphasis added) resulting in "streams flowing in opposite directions." Paragraph [0008] describes how "when the aforementioned streams come together at *different levels*... the liquid surface remains calm," (emphasis added) and therefore advantageous effects are achieved. Applicants respectfully submit that the "different levels" discussed in paragraph [0008] clearly arise from the geometry of the plates making up the slot or diaphragm, wherein

one plate is higher than the other in the bath. Thus, the edges of the plates making up the "slot or diaphragm" *must* be "the edges of the discharge openings" (in accordance with Applicants' position that the slot or diaphragm corresponds to the discharge opening) or else the above discussed passages cannot be understood as being logically coherent. In other words, the only logical understanding of the above passages is that the different *heights* of the plates *making up the slot or diaphragm* create "different levels" "at the edges of the discharge opening." Accordingly, the slot or diaphragm corresponds to the discharge opening, at the bottom of the bath, in accordance with Amended Figure 2.

(3) Paragraph [0015] describes the opening at "the bottom of the coagulation bath." As discussed above, this opening is clearly the discharge opening. However, paragraph [0015] also states that "if the *opening* has a [desired geometry then advantageous effects arise] ... and the filaments are prevented from being pressed together or suffering damage from scraping along the edge *of the slot or diaphragm*." (Emphasis added). Applicants respectfully submit that this passage can only make sense if the slot or diaphragm corresponds to the discharge opening, as is shown in Amended Figure 2. If the slot or diaphragm is arranged as shown in Hypothetical Figure 2 then the discharge opening is separate from the slot or diaphragm, and there is no reason why the geometry of the discharge opening would affect "scraping along the edge of the slot or diaphragm." Therefore, this passage necessarily implies that the opening through the slot or diaphragm is *the same* as the discharge opening. Thus, since the discharge opening must be located at the bottom of the bath (as discussed above), the slot or diaphragm must also be located at the bottom of the bath.

(4) Finally, Paragraph [0030] states that "the spinning device is preferably closed with a covering plate just *above* the *slot or diaphragm*." Applicants respectfully submit that the *only* way the bath could be closed by such a covering plate "above" the slot or diaphragm

is if the slot or diaphragm is itself positioned at the bottom of the bath, such that the discharge opening in the bottom of the bath is *the same* as the "slot or diaphragm." If the slot or diaphragm were located at any other location than at the bottom of the bath (for example, some distance above the discharge opening as shown in Hypothetical Figure 2) then the bath clearly would not be "closed" by a plate *above* such a slot or diaphragm. In other words, this passage in paragraph [0030] is not logically consistent with the arrangement shown in Hypothetical Figure 2, because the bath would not be "closed" if a covering plate were put on top of the slot or diaphragm as shown therein. On the other hand, this passage necessarily implies that the slot or diaphragm is located as shown in Amended Figure 2, because the configuration shown therein can clearly be closed by a covering plate above the slot or diaphragm.

Accordingly, for these four reasons, as well as all of the reasons discussed previously throughout prosecution, a person having ordinary skill in the art would have understood that Amended Figure 2 is necessarily implicitly disclosed by the specification as originally filed. Thus, Amended Figure 2 does not constitute new matter.

Reconsideration and withdrawal of the objection are respectfully requested.

II. Rejection under 35 U.S.C. §112, first paragraph

Claims 1-7 are rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement. Specifically, the Office Action alleges that the presently claimed feature in independent claims 1 and 2 "the slot or diaphragm is positioned at the bottom of the coagulation bath" is not supported by the original disclosure.

Applicants respectfully submit that the rejection depends on the same underlying technical issues as discussed above with respect to the objection to the drawings. Therefore, Applicants respectfully submit that the presently claimed feature "the slot or diaphragm is positioned at the bottom of the coagulation bath" is fully supported by the original disclosure

for the same four reasons listed above (as well as all the reasons discussed previously throughout prosecution).

Accordingly, claims 1-7 fully comply with the written description requirement.

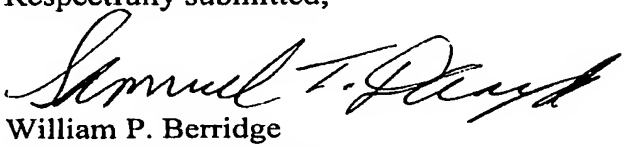
Reconsideration and withdrawal of the rejection are respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



William P. Berridge
Registration No. 30,024

Samuel T. Dangremond
Registration No. 60,466

WPB:STD/std

Attachment:
Petition for Extension of Time

Date: April 28, 2009

OLIFF & BERRIDGE, PLC
P.O. Box 320850
Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE AUTHORIZATION
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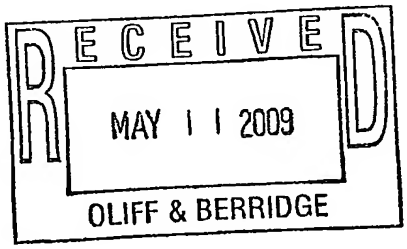
APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,713	07/06/2004	Johannes J. Meerman	119567	7197

25944 7590 05/07/2009

OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850



EXAMINER	
WOLLSCHLAGER, JEFFREY MICHAEL	
ART UNIT	PAPER NUMBER
1791	
MAIL DATE	DELIVERY MODE
05/07/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Advisory Action Before the Filing of an Appeal Brief	Application No. 10/500,713	Applicant(s) MEERMAN ET AL.	
	Examiner JEFFREY WOLLSCHLAGER	Art Unit 1791	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 28 April 2009 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:
   a) ☒ The period for reply expires 4 months from the mailing date of the final rejection.
   b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

   Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   (a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
   (b) ☐ They raise the issue of new matter (see NOTE below);
   (c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   (d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

   NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☐ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

   The status of the claim(s) is (or will be) as follows:
   Claim(s) allowed: _____.
   Claim(s) objected to: _____.
   Claim(s) rejected: _____.
   Claim(s) withdrawn from consideration: _____.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: see attached.
12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
13. ☐ Other: _____.

/Jeff Wollschlager/
Examiner, Art Unit 1791

DETAILED ACTION

Response to Arguments

Applicant's arguments filed April 28, 2009 have been fully considered, but they are not persuasive. As an initial matter, the examiner provides the following pertinent citations from MPEP 2163 which provide the basis for the 35 USC 112 written description analysis (emphasis provided by the examiner):

> Thus, the written description requirement prevents an applicant from claiming subject matter that was not adequately described in the specification as filed. New or amended claims which introduce elements or limitations which are not supported by the as-filed disclosure violate the written description requirement. See, e.g., In re Lukach, 442 F.2d 967, 169 USPQ 795 (CCPA 1971) (subgenus range was not supported by generic disclosure and specific example within the subgenus range); In re Smith, 458 F.2d 1389, 1395, 173 USPQ 679, 683 (CCPA 1972) (a subgenus is not necessarily described by a genus encompassing it and a species upon which it reads).
>
> The fundamental factual inquiry is whether the specification conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed. See, e.g., Vas-Cath, Inc., 935 F.2d at 1563-64, 19 USPQ2d at 1117.
>
> Introduction of claim changes which involve narrowing the claims by introducing elements or limitations which are not supported by the as-filed disclosure is a violation of the written description requirement of 35 U.S.C. 112, first paragraph. In re Ruschig, 379 F.2d 990, 995, 154 USPQ 118, 123 (CCPA 1967) ("If n-propylamine had been used in making the compound instead of n-butylamine, the compound of claim 13 would have resulted. Appellants submit to us, as they did to the board, an imaginary specific example patterned on specific example 6 by which the above butyl compound is made so that we can see what a simple change would have resulted in a specific supporting disclosure being present in the present specification. The trouble is that there is no such disclosure, easy though it is to imagine it.")
>
> See also In re Smith, 458 F.2d 1389, 1395, 173 USPQ 679, 683 (CCPA 1972) ("Whatever may be the viability of an inductive-deductive approach to arriving at a claimed subgenus, it cannot be said that such a subgenus is necessarily described by a genus encompassing it and a species upon which it reads.").
>
> For the written description requirement, an applicant's specification must reasonably convey to those skilled in the art that the applicant was in possession of the claimed invention as of the date of invention.

The examiner has the initial burden of presenting evidence or reasoning to explain why persons skilled in the art would not recognize in the original disclosure a description of the invention defined by the claims. See Wertheim, 541 F.2d at 263, 191 USPQ at 97 ("[T]he PTO has the initial burden of presenting evidence or reasons why persons skilled in the art would not recognize in the disclosure a description of the invention defined by the claims."). However, when filing an amendment an applicant should show support in the original disclosure for new or amended claims.

To comply with the written description requirement of 35 U.S.C. 112, para. 1, or to be entitled to an earlier priority date or filing date under 35 U.S.C. 119, 120, or 365(c), each claim limitation must be expressly, implicitly, or inherently supported in the originally filed disclosure. When an explicit limitation in a claim "is not present in the written description whose benefit is sought it must be shown that a person of ordinary skill would have understood, at the time the patent application was filed, that the description requires that limitation." Hyatt v. Boone, 146 F.3d 1348, 1353, 47 USPQ2d 1128, 1131 (Fed. Cir. 1998). See also In re Wright, 866 F.2d 422, 425, 9 USPQ2d 1649, 1651 (Fed. Cir. 1989)

"To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'")

An objective standard for determining compliance with the written description requirement is, "does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed." In re Gosteli, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989). Under Vas- Cath, Inc. v. Mahurkar, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir.1991)

As an initial matter, applicant argues on pages 2-4 that either hypothetical Figure 2 or amended figure 2 must be correct. The examiner submits that there is no disagreement with the fact that the original specification provides support for an opening at the bottom of the coagulation bath. The issue at dispute is whether the original disclosure expressly, implicitly or inherently discloses that the slot or diaphragm is the same as the discharge opening. In this regard, the examiner maintains the objection to amended Figure 2 and the 35 USC 112 first paragraph rejection of the claims.

Applicant provides four new arguments that are substantially similar to the previous arguments set forth in the prosecution of this application. Essentially, the examiner maintains that these arguments attempt to employ an inductive approach similar to the arguments previously presented that, while after seeing amended Figure 2, may be conceivably imagined; they do not demonstrate that the original specification described with reasonably clarity the claimed invention such that it reasonably follows that applicant was in possession of the claimed invention at the time of filing. The examiner further submits that what is clearly set forth in the specification supports the rejection. For example, paragraph [0029] recites that "[i]n all embodiments, each of the spinning fields 2 is in combination with a slot or diaphragm 5." while paragraph [0018] recites that "it is preferred to provide the bottom of the coagulation bath per spinning field with an opening." Accordingly, it follows that since each spinning field must be in combination with a slot or diaphragm while it is only preferred that each spinning field is provided with a discharge opening at the bottom of the coagulation bath that the slot or diaphragm does not correspond to the discharge opening as argued.

The examiner submits that the arguments take portions of the specification and concludes that they must be linked such that amended Figure 2 is the clear and only possible result. These arguments are not persuasive. As set forth above, the examiner has provided citations from the specification itself, that do not require forming linkages between disparate sections of the specification, that makes it clear the original specification does not clearly convey or require that the slot or diaphragm is the same as the discharge opening. Therefore, while the sections presented in the arguments are interpreted in view of amended Figure 2, the ability to make such an interpretation itself, no matter how tenuous, after presenting amended Figure 2, does not show that amended Figure 2 or the claims based on amended Figure 2 are

expressly, implicitly, or inherently disclosed in the original specification such that it is reasonably clear applicant was in possession of the claimed invention at the time of filing.

In arguments one and three, applicant argues that the geometry of the slot is clearly the geometry of the coagulation bath's bottom. This argument is not persuasive. The examiner notes, for example, that hypothetical Figure 2 also reasonably is understood to provide the required geometry. Further, the examiner submits that the linkage of the word "geometry" does not expressly, implicitly, or inherently, link the location of the slot or diaphragm and the discharge opening itself. Further still, the examiner points again to paragraphs [0018] and [0029] as set forth above, which demonstrates that the bottom of the coagulation bath and the slot or diaphragm do not "necessarily" correspond to each other as set forth in the arguments.

Applicant argues that the disclosure of streams flowing in opposite direction with the disclosure of streams coming together at different levels provides evidence that the only logical understanding is that the different heights of the plates at the bottom of the bath create the different levels. This argument is not persuasive. The examiner submits that a variety of other configurations can be considered to meet the scenario set forth in the argument. For example, as the streams flow in opposite directions and hit the walls of the bath they will then move throughout different levels of the bath.

Finally, applicant argues that the disclosure of a "covering plate just above the slot or diaphragm" to close the spinning device makes it clear that the slot or diaphragm is the same as the discharge opening because were that not the case the bath could clearly not be "closed" since the discharge opening would not be covered. This argument is not persuasive. The examiner submits that a very straightforward reading of the citation suggests covering the slot or diaphragm itself separate from any linkage to the opening at the bottom. Simply because the

discharge opening would not be directly covered in no way requires or implies the argued linkage.

Accordingly, the examiner maintains the rejection of claims 1-7 and the objection to the drawings filed on April 30, 2007.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEFFREY WOLLSCHLAGER whose telephone number is (571)272-8937. The examiner can normally be reached on Monday - Thursday 6:45 - 4:15, alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeff Wollschlager/
Examiner, Art Unit 1791

May 6, 2009

XIV. APPENDIX E - RELATED CASES APPENDIX

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